

**Study of the Biology of Lingcod off
the West Coast of Vancouver Island,
M/V Arctic Harvester, November 22-
December 2, 1977**

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STUDY OF THE BIOLOGY OF LINGCOD OFF THE WEST COAST OF VANCOUVER
ISLAND, M/V ARCTIC HARVESTER, NOVEMBER 22-DECEMBER 2, 1977.

by

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ABSTRACT

Cass, A. J., R. J. Beamish, and M. S. Smith. 1984. Study of the biology of lingcod off the west coast of Vancouver Island, M/V ARCTIC HARVESTER, November 22-December 2, 1977. Can. Data Rep. Fish. Aquat. Sci. 461: 73 p.

Bottom trawling for lingcod (*Ophiodon elongatus*) was conducted off the west coast of Vancouver Island. The primary purpose was to determine the size and age of lingcod at maturity.

Lingcod comprised about 10% of the total fish biomass. Of the 901 lingcod caught, 94% were caught in 7 sets off Clayoquot Sound at a depth range of 150-190 m. Females accounted for 96% of the total catch. Females ranging from 78-88 cm in fork length dominated the catch, accounting for 58% of the total catch off Clayoquot Sound. The age distribution of females was characterized by a dome-shaped series of adjacent year-classes ranging from 2-12 yr. Females averaged 6 yr in age. Male lingcod ranged from 51-73 cm in fork length and from 2-6 yr in age. Males averaged 4 yr in age. Mean lengths of females increased an average of 5.7 cm/yr. Males increased an average 3.9 cm/yr.

Eighty percent of the females sampled off Clayoquot Sound were mature with 66% in a ripening state (R1 and R2). Sixty-four percent of the males sampled were mature. Most males (93%) were in a pre-ripening state of maturity. In adult female lingcod there was a progressive increase in mean length at each advanced stage of maturity indicating larger maturing females become ripe and possibly spawn before smaller females. The length of 50% maturity was 60 cm for males and 76 cm for females. The age of 50% maturity was 4 yr for males and 5 yr for females.

Key words: lingcod, maturity, length, age, probit analysis.

RÉSUMÉ

Cass, A. J., R. J. Beamish, and M. S. Smith. 1984. Study of the biology of lingcod off the west coast of Vancouver Island, M/V ARCTIC HARVESTER, November 22-December 2, 1977. Can. Data Rep. Fish. Aquat. Sci. 461: 73 p.

Une pêche de la morue-lingue (*Ophiodon elongatus*) au chalut de fond a été effectuée au large de la côte ouest de l'île Vancouver. L'objectif principale de cette pêche était de déterminer la taille et l'âge de l'espèce lors de la maturité.

La morue-lingue composait environ 10% de la biomasse totale de poisson. Des 901 morues-lingues capturées, 94% ont été pêchées lors de sept mouillages, au large de la baie Clayoquot, à une profondeur variant entre 150 et 190 m.

Les femelles constituaient 96% des prises totales. Les femelles d'une longueur à la fourche de 78 à 88 cm étaient les plus nombreuses, représentant 58% des prises totales. La distribution des âges des femelles était caractérisée par une série, en forme en dôme, de classes d'âge adjacentes allant de 2 à 12 ans. L'âge des femelles se situait à environ 6 ans. La longueur à la fourche des morues-lingues mâles, qui étaient âgés de 2 à 6 ans, variait entre 51 et 73 cm; leur âge se situait à environ 4 ans. On a établi que les longueurs moyennes des femelles augmentent d'environ 5,7% cm/an, comparativement à environ 3,9 cm/an pour les mâles.

Par ailleurs, 80% des femelles capturées au large de la baie Clayoquot étaient matures et 66% étaient en phase d'élaboration génitale (R1 et R2), alors que 64% des mâles étaient matures. La plupart des mâles (93%) étaient en état de pré-maturation. On a observé que la longueur moyenne des morueslingues femelles adultes augmente progressivement à chacune des dernières phases de la maturité, ce qui laisse supposer que les plus grosse femelles deviennent oeuvées et frayent plus tôt que les femelles plus petites. À mi-maturité, les mâles mesuraient 60 cm et étaient âgés de 4 ans tandis que les femelles mesuraient 76 cm et étaient âgées de 5 ans.

Mots-clés: morue-lingue, maturité, longueur, âge, analyse par la méthode des probits

INTRODUCTION

The purpose of the November 22-December 2, 1977 bottom-trawl cruise was to determine the size and age of lingcod at first maturity. The timing of the cruise was selected to coincide with the period during which lingcod maturity is easily discerned on the basis of gross gonadal observation; that is, during the winter pre-spawning aggregation phase.

METHODS

The M/V ARCTIC HARVESTER, a 43 m stern trawler, was chartered to conduct bottom trawling off the west coast of Vancouver Island during November 22-December 2, 1977. An Engel high-opening bottom trawl equipped with 53-cm bobbins and a 3-cm stretched mesh codend liner was used on all tows. Set locations were positioned on trawlable bottom particularly on those grounds where commercial trawl catches of lingcod were reported during the November-December period.

The catch composition of each set was identified by species. Lingcod were sorted into 55 L galvanized tubs. Each tub was weighed to obtain the total catch. The weight of all other species was calculated as the proportion of the total catch based on the estimated weight of the codend.

All lingcod were sexed, measured for fork length to the nearest centimeter and examined for maturity. Sections of the 4th-9th second dorsal fin rays were collected for age determination according to the criteria of Beamish and Chilton (1977). The total catch of lingcod from 12 sets was examined for stomach contents.

Biological sampling of species other than lingcod was conducted when time permitted. Juvenile sablefish (Anoplopoma fimbria) from 4 sets were sexed and measured for fork length. Otoliths were collected for ageing purposes. One sample of pollock (Theragra chalcogramma), redstripe rockfish (Sebastes proriger), and redbanded rockfish (Sebastes babcocki) was sexed and measured for fork length. All Chinook salmon (Oncorhynchus tshawytscha) and halibut (Hippoglossus stenolepis) were sexed and measured for fork length.

RESULTS AND DISCUSSION

GENERAL CRUISE SUMMARY

A total of 45 species were captured (Tables 1 and 2) in 29 sets off the west coast of Vancouver Island (Fig. 1). Set information is listed in Appendix 1.

Lingcod were captured in 22 sets and comprised about 10% of the total fish biomass. A total of 901 lingcod were captured. Lingcod were highly concentrated in offshore areas off Clayoquot Sound. Ninety-four percent were caught in 7 sets off Clayoquot Sound (sets 10, 11, 14, 15, 24, 25 and 26) within a depth range of 150-190 m. Lingcod were the dominant species in 3 sets (sets 24, 25 and 26).

Rockfish species comprised about 67% of the estimated biomass and were dominant in 6 sets. Rockfish were captured in large quantities in association with lingcod. Canary rockfish (Sebastes pinniger) comprised 22% of the estimated rockfish biomass; redbanded rockfish (Sebastes babcocki) 15%, silvergray rockfish (Sebastes brevispinis) 14%, Bocaccio (Sebastes paucispinis) 7%, yellowtail rockfish (Sebastes flavidus) 5%, and redstripe rockfish (Sebastes proriger) 4%.

Other species caught included spiny dogfish (Squalus acanthias) (11%), Pacific cod (Gadus macrocephalus) (4%) and ratfish (Hydrolagus coliei) (4%). All other species each represented less than 1% of the total estimated biomass (Table 2).

A summary of lingcod sampling information is presented in Table 3.

SEX AND SIZE COMPOSITION

Females comprised 96% of the total lingcod catch. The low number of males on trawling grounds is consistent with samples collected from commercial trawl landings during the winter months (Case, unpublished data) and is believed to be related to the movement of adult males to rocky untrawlable areas prior to spawning.

Length frequencies by set are presented in Appendix 2. Within the main concentration of lingcod encountered off Clayoquot Sound (sets 10, 11, 14, 15, 24, 25 and 26), females ranged from 46-117 cm in fork length. Females ranging in length from 78-88 cm dominated the catch as a single mode (Fig. 2) and accounted for 58% of the total number sampled. Females less than 70 cm accounted for only 8% of the catch. The mean length of females sampled off Clayoquot Sound was 82 cm. Only 22 (3%) of the lingcod caught off Clayoquot Sound were males. Males caught off Clayoquot Sound ranged from 51-73 cm and averaged 62 cm in fork length.

AGE AND GROWTH

Age frequencies by set are presented in Appendix 3. The age distribution of females caught off Clayquot Sound was characterized by a dome-shaped series of adjacent year-classes ranging from 2 to 12 yr (Table 4; Fig. 3). Females aged 5-8 yr dominated accounting for 84% of the total number sampled. The mean age of females sampled off Clayoquot Sound was 6 yr. Male lingcod off Clayoquot Sound ranged from 2-6 yr and averaged 4 yr in age.

Growth of lingcod was examined from the relationship between fork length and age. Growth was rapid, particularly for females, and increased overall age classes present (Table 4, Fig. 3). Females increased an average of 5.7 cm/yr. The mean length at age of male lingcod after age 2 was significantly less ($p < 0.01$) than mean lengths of similar aged females. Males increased an average of 3.9 cm/yr. Although the sample size of males in this study was small, the average growth rates of males and females observed in this study are similar to growth rates observed in other studies (Cass et al. 1983).

MATURITY

A total of 894 lingcod were examined for maturity state according to the criteria in Table 5. Of the 826 female lingcod sampled off Clayoquot Sound (sets 10, 11, 14, 15, 24, 25 and 26), 80% were mature. The majority of these (66%) were in a ripening state of maturity, with 48% in a R2 stage and 18% in a R1 stage. Twenty-eight percent of the mature females were in a pre-ripening state of maturity, with 15% in a R-1 stage and 13% in a R-2 stage. Three percent of the mature females were ripe and 2% were resting. Twenty percent of the females caught off Clayoquot Sound were immature, with 79% in a I-2 stage and 21% in an I-1 stage. In a small number of females it was difficult to distinguish between immature I-2 and resting (0.2%) and between immature I-2 and R-1 (1.0%). These fish were excluded in our analysis of size and age at maturity.

Of the 22 males caught off Clayoquot Sound, 14 (64%) were mature. Thirteen of these were in a pre-ripening state and one was in a ripening state. However, because maturing males moved into untrawlable areas prior to spawning, the stages of maturity observed in this study may not be representative. Eight males (36%) were immature, with five in an I-1 stage and three in an I-2 stage.

Length frequencies by maturity stage of male and female lingcod caught off Clayoquot Sound are presented in Tables 6 and 7, respectively. Corresponding age frequencies are presented in Tables 8 and 9. In adult females there was a progressive increase in the mean length at each advanced stage of maturity (Fig. 4). This indicates larger females become ripe and possibly spawn before smaller females. A similar comparison of size and maturation rates in males was not possible because of the low sample sizes.

The mean length and mean age at 50% maturity were estimated from

percent maturities at length^a (Tables 10 and 11) and age (Tables 12 and 13) using probit analysis (Leslie et al. 1945). The relationship between percent maturity at length and age is shown in Fig. 5. The length of 50% maturity was 60 cm (95% C.L. = 55-64 cm) for males and 76 cm (95% C.L. = 75-77 cm) for females. The age of 50% maturity was 4 yr (95% C.L. = 3.1-4.2 yr) for males and 5 yr (95% C.L. = 4.4-4.8 yr) for females. The difference in the length and age at 50% maturity between males and females was significant ($P < 0.05$) and suggests males reach maturity about one year before females. However, larger sample sizes of males are required to further examine the relationship between length and age at maturity in male lingcod.

STOMACH CONTENTS

A total of 164 lingcod from 12 sets were examined for stomach contents (Table 3). Of the total number examined, 78 (48%) were empty. The remaining lingcod examined contained a variety of food organisms. The average volume of food organisms, including empty stomachs, was 85.8 cc. Herring comprised 57.3% of the total volume. Other food included rex sole (13.7%), unidentified rockfish (10.3%), unidentified fish remains (6.1%), sablefish (5.6%), squid (3.2%), octopus (1.4%), tomcod (1.1%), unidentified flatfish (1.1%) and unidentified digested matter (0.4%).

OTHER FISHES

A summary of species sampled other than lingcod is presented in Table 14.

The total catch of 275 sablefish from four sets was sampled for length by sex. Otoliths were collected for ageing purposes but were not read for this study. For combined sets, sablefish ranging in lengths of 21-32 cm were present as a single prominent mode (Table 15), accounting for 97% of the total catch. Sablefish within this size range correspond to age-0 sablefish of the strong 1977 year class observed in other studies (Beamish et al. 1980).

The total catch of 154 pollock from set 4 were sampled for length by sex (Table 16). Males comprised 48% of the total catch and averaged 32.4 cm in length. Females averaged 35.6 cm in length.

The total catch of 141 redstripe rockfish (Sebastes proriger) from set 8 was sampled for length by sex (Table 17). Males comprised 48% of the total catch and averaged 25.6 cm in length. Females averaged 26.5 cm in length. A sample of 191 redbanded rockfish (S. babcocki) from set 29 were sampled for length by sex (Table 17). Males accounted for 49% of the total number sampled. Males and females averaged 52.3 cm and 58.8 cm, respectively.

^aPercent maturities at length for males were averaged over 5-cm length intervals to reduce the high variability in percent maturities at 1-cm length intervals inherent in the small sample size of males. Percent maturities at length for females were calculated using 1 cm length intervals.

The total catch of 59 chinook salmon were sampled for length by sex (Table 18). Males comprised 47% of the total catch. Males and females averaged 62.0 cm and 64.7 cm in length. A total of 7 halibut were caught (Table 19). Males averaged 73.0 cm and females averaged 81.5 cm.

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Ray Scarsbrook, Dawn Barnes and Doris Chilton aided in the preparation of this report.

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Table 1. List of species caught off the west coast of Vancouver Island, M/V ARCTIC HARVESTER, November 22-December 2, 1977.

Common name	Species name
Lingcod	<u>Ophiodon elongatus</u>
Kelp greenling	<u>Hexagrammos decagrammus</u>
Pacific hake	<u>Merluccius productus</u>
Walleye pollock	<u>Theragra chalcogramma</u>
Spiny dogfish	<u>Squalus acanthias</u>
Ratfish	<u>Hydrolagus colliei</u>
Skate sp.	<u>Raja sp.</u>
Northern smoothtongue	<u>Leuroglossus stilbius schmidti</u>
Surf smelt	<u>Hypomesus pretiosus pretiosus</u>
Eulachon	<u>Thaleichthys pacificus</u>
Pacific herring	<u>Clupea harengus pallasii</u>
American shad	<u>Alosa sapidissima</u>
Chinook salmon	<u>Oncorhynchus tshawytscha</u>
Shiner perch	<u>Cymatogaster aggregata</u>
Pacific cod	<u>Gadus macrocephalus</u>
Pacific tomcod	<u>Microgadus proximus</u>
Sablefish	<u>Anoplopoma fimbria</u>
Canary rockfish	<u>Sebastes pinniger</u>
Greenstriped rockfish	<u>Sebastes elongatus</u>
Redstripe rockfish	<u>Sebastes proriger</u>
Widow rockfish	<u>Sebastes entomelas</u>
Yelloweye rockfish	<u>Sebastes ruberrimus</u>
Yellowtail rockfish	<u>Sebastes flavidus</u>
Bocaccio	<u>Sebastes paucispinis</u>
Silvergray rockfish	<u>Sebastes brevispinis</u>
Redbanded rockfish	<u>Sebastes babcocki</u>
Sharpchin rockfish	<u>Sebastes zacentrus</u>
Pygmy rockfish	<u>Sebastes wilsoni</u>
Rosethorn rockfish	<u>Sebastes helvomaculatus</u>
Vermilion rockfish	<u>Sebastes miniatus</u>
Black rockfish	<u>Sebastes melanops</u>
Dover sole	<u>Microstomus pacificus</u>
English sole	<u>Parophrys vetulus</u>
Flathead sole	<u>Hippoglossoides elassodon</u>
Petrals sole	<u>Eopsetta jordani</u>
Rex sole	<u>Glyptocephalus zachirus</u>
Rock sole	<u>Lepidopsetta bilineata</u>
Curlfin Sole	<u>Pleuronichthys decurrens</u>
Halibut	<u>Hippoglossus stenolepis</u>
Arrowtooth flounder	<u>Atheresthes stomias</u>
Wolf eel	<u>Anarrhichthys ocellatus</u>
Sidestripe shrimp	<u>Pandalopsis dispar</u>
Smooth pink shrimp	<u>Pandalus jordani</u>
Prawn	<u>Pandalus platyceros</u>
Squid	<u>Loligo opalescens</u>

Table 2. Number and weight of species caught by set off the west coast of Vancouver Island, M/V ARCTIC HARVESTER, November 22-December 2, 1977.^a

[illegible]

Table 2 (cont'd)

Set no.	7		8		9		10		11		12	
Est. total catch (kg)	290		700		690		9100		13,640		273	
Duration (min)	60		60		45		60		60		30	
Species	Wt	no	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No
Lingcod	34	5	14	2	-	-	910	124	360	53	30	4
Kelp greenling	-	-	-	-	-	-	-	-	-	-	-	-
Pacific hake	-	-	-	-	-	-	-	-	-	-	-	-
Walleye pollock	-	-	-	-	-	-	-	-	-	-	-	-
Spiny dogfish	14	-	-	-	-	-	T	-	T	-	-	-
Ratfish	-	-	-	-	614	-	-	-	-	-	-	-
Skate sp.	-	-	-	-	-	1	-	-	-	-	-	-
Northern smoothtongue	-	-	204	-	T	-	-	-	-	-	-	-
Surf smelt	-	-	-	-	-	-	-	-	-	-	-	-
Eulachon	-	-	68	-	-	-	-	-	-	-	-	-
Pacific herring	-	-	-	-	-	-	-	-	-	-	-	-
American shad	-	-	-	-	-	-	-	-	-	-	-	-
Chinook salmon	-	4	-	13	-	-	-	-	-	-	-	-
Shiner perch	-	-	-	-	-	-	-	-	-	-	-	-
Pacific cod	-	-	-	-	-	-	910	-	1360	-	-	-
Pacific tomcod	-	-	-	-	-	-	-	-	-	-	-	-
Sablefish	-	-	-	-	-	-	-	-	-	-	-	-
Canary rockfish	-	-	-	-	-	-	4090	-	6140	-	-	-
Greenstriped rockfish	-	-	-	-	-	-	-	-	-	-	-	-
Redstripe rockfish	-	-	409	-	-	-	-	-	-	-	-	-
Widow rockfish	-	-	-	-	-	-	-	-	-	-	-	-
Yelloweye rockfish	-	-	-	-	-	-	-	-	-	-	-	-
Yellowtail rockfish	-	-	-	-	-	-	910	-	1360	-	243	-
Bocaccio	-	-	-	-	-	-	910	-	1690	-	-	-
Silvergray rockfish	-	-	-	-	-	-	1364	-	2730	-	-	-
Redbanded rockfish	-	-	-	-	-	-	-	-	-	-	-	-
Sharpchin rockfish	-	-	-	-	-	-	-	-	-	-	-	-
Pygmy rockfish	-	-	-	-	-	-	-	-	-	-	-	-
Rosethorn rockfish	-	-	-	-	-	-	-	-	-	-	-	-
Vermilion rockfish	-	-	-	-	-	-	-	-	-	-	-	-
Black rockfish	-	-	-	-	-	-	-	-	-	-	-	-
Unidentified sole sp.	-	-	-	-	68	-	-	-	-	-	-	-
Unidentified rockfish sp.	-	-	-	-	-	-	-	-	-	-	-	-
Dover sole	-	-	-	-	-	-	-	-	-	-	-	-
English sole	123	-	-	-	-	-	-	-	-	-	-	-
Flathead sole	-	-	-	-	-	-	-	-	-	-	-	-
Petrale sole	55	-	-	-	-	-	-	-	-	-	-	-
Rex sole	-	-	-	-	-	-	-	-	-	-	-	-
Rock sole	55	-	-	-	-	-	-	-	-	-	-	-
Curlfin Sole	-	-	-	-	-	-	-	-	-	-	-	-
Halibut	-	1	-	-	-	-	-	-	-	-	-	-
Arrowtooth flounder	-	-	-	-	-	-	-	-	-	-	-	-
Wolf eel	-	-	-	-	-	-	-	-	-	-	-	-
Sidestripe shrimp	-	-	-	-	-	-	-	-	-	-	-	-
Smooth pink shrimp	-	-	-	-	-	-	-	-	-	-	-	-
Prawn	-	-	-	-	-	-	-	-	-	-	-	-
Squid	-	-	-	-	-	-	-	-	-	-	-	-

Table 2 (cont'd)

Set no.	13		14		15		16		17		18	
Est. total catch (kg)	470		1680		4100		910		205		26	
Duration (min)	30		60		30		60		60		10	
Species	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No
Lingcod	7	1	245	36	245	36	-	-	-	-	3	1
Kelp greenling	-	-	-	-	-	-	-	-	-	-	-	1
Pacific hake	-	-	-	-	-	-	90	-	-	-	-	-
Walleye pollock	-	-	-	-	-	-	23	-	11	-	-	-
Spiny dogfish	46	-	-	-	820	-	90	-	182	-	-	1
Ratfish	T	-	-	-	-	-	705	-	-	-	-	-
Skate sp.	-	-	-	-	-	-	T	-	-	-	-	-
Northern smoohtongue	-	-	-	-	-	-	-	-	-	-	-	-
Surf smelt	-	-	-	-	-	-	-	-	T	-	-	-
Eulachon	-	-	-	-	-	-	-	-	-	-	-	-
Pacific herring	-	-	-	-	-	-	-	-	5	-	-	-
American shad	-	-	-	-	-	-	-	-	-	-	-	-
Chinook salmon	-	-	-	1	-	-	-	-	-	1	-	-
Shiner perch	-	-	-	-	-	-	-	-	T	-	-	-
Pacific cod	46	-	-	-	-	-	-	-	T	-	-	-
Pacific tomcod	T	-	-	-	-	-	-	-	-	-	-	-
Sablefish	-	1	-	6	T	-	-	-	-	-	-	-
Canary rockfish	273	-	636	-	205	-	T	-	T	-	11	-
Greenstriped rockfish	-	-	-	-	-	-	T	-	-	-	-	-
Redstripe rockfish	-	-	-	-	1636	-	-	-	-	-	-	-
Widow rockfish	-	-	-	-	-	-	-	-	-	-	-	-
Yelloweye rockfish	-	-	-	-	-	-	-	-	-	-	-	-
Yellowtail rockfish	91	-	-	-	-	-	-	-	-	-	-	-
Bocaccio	-	-	477	-	410	-	T	-	-	-	-	-
Silvergray rockfish	-	-	160	-	820	-	-	-	-	-	-	-
Redbanded rockfish	-	-	-	-	-	-	-	-	-	-	-	-
Sharpchin rockfish	-	-	-	-	-	-	-	-	-	-	-	-
Pygmy rockfish	-	-	-	-	-	-	-	-	-	-	-	-
Unidentified sole sp.	-	-	-	-	-	-	-	-	-	-	-	-
Unidentified rockfish sp.	-	-	-	-	-	-	-	-	-	-	-	-
Rosethorn rockfish	-	-	-	-	-	-	-	-	-	-	-	-
Vermilion rockfish	-	-	-	-	-	-	-	-	-	-	5	3
Black rockfish	-	-	-	-	-	-	-	-	-	-	5	3
Dover sole	-	-	-	-	-	-	-	-	-	-	-	-
English sole	-	-	160	-	T	-	-	-	T	-	-	-
Flathead sole	-	-	-	-	-	-	-	-	-	-	-	-
Petrable sole	-	-	-	-	-	-	-	-	-	-	-	-
Rex sole	-	-	-	-	-	-	T	-	-	-	-	-
Rock sole	-	-	-	-	-	-	-	-	T	-	-	-
Curlfin Sole	-	-	-	-	-	-	-	-	-	-	-	-
Halibut	-	-	-	-	-	1	-	-	-	1	-	-
Arrowtooth flounder	-	-	-	-	-	-	-	-	-	-	-	-
Wolf eel	-	-	-	-	-	-	-	-	-	1	-	-
Sidestripe shrimp	-	-	-	-	-	-	T	-	-	-	-	-
Smooth pink shrimp	-	-	-	-	-	-	T	-	-	-	-	-
Prawn	-	-	-	-	-	-	-	-	-	-	-	-
Squid	-	-	-	-	-	-	-	-	T	-	-	-

Table 2 (cont'd)

Set no.	19		20		21		22		23		24	
Est. total catch (kg)	10		330		91		3500		2300		1420	
Duration (min)	5		30		30		60		35		60	
Species	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No
Lingcod	2	1	5	1	-	-	46	7	26	4	1136	172
Kelp greenling	-	-	-	-	-	-	-	-	-	-	-	-
Pacific hake	-	-	-	-	-	-	-	-	-	-	-	-
Walleye pollock	-	-	-	-	-	-	-	-	-	-	-	-
Spiny dogfish	3	1	96	-	27	-	-	-	-	-	-	-
Ratfish	-	-	191	-	23	-	T	-	-	-	-	-
Skate sp.	-	-	-	-	-	-	-	1	-	-	-	-
Northern smoothtongue	-	-	-	-	-	-	-	-	-	-	-	-
Surf smelt	-	-	-	-	-	-	-	-	-	-	-	-
Eulachon	-	-	-	-	2	-	-	-	-	-	T	-
Pacific herring	-	-	-	-	1	-	-	-	-	-	-	-
American shad	-	-	-	-	-	-	-	-	-	-	-	-
Chinook salmon	-	-	-	-	-	-	-	-	-	-	-	-
Shiner perch	-	-	-	-	T	-	-	-	-	-	-	-
Pacific cod	-	-	-	-	9	-	-	-	T	-	-	-
Pacific tomcod	-	-	-	-	2	-	-	-	-	-	-	-
Sablefish	-	-	-	3	-	-	-	-	-	-	-	-
Canary rockfish	-	-	T	-	-	-	364	-	227	-	90	-
Greenstriped rockfish	-	-	-	-	-	-	-	-	-	-	-	-
Redstripe rockfish	-	-	-	-	-	-	T	-	-	-	-	-
Widow rockfish	-	-	-	-	-	-	364	-	T	-	-	-
Yelloweye rockfish	-	1	-	1	-	-	T	-	T	-	11	-
Yellowtail rockfish	-	-	-	2	-	-	545	-	-	-	-	-
Bocaccio	-	-	-	-	11	-	364	-	341	-	23	-
Silvergray rockfish	-	-	-	-	-	-	1273	-	1705	-	90	-
Redbanded rockfish	-	-	-	-	-	-	-	-	-	-	-	-
Sharpchin rockfish	-	-	-	-	-	-	364	-	T	-	-	-
Pygmy rockfish	-	-	-	-	-	-	T	-	-	-	-	-
Rosethorn rockfish	-	-	-	-	-	-	T	-	-	-	-	-
Vermilion rockfish	-	-	-	-	-	-	-	-	-	-	-	-
Black rockfish	-	-	-	-	-	-	-	-	-	-	-	-
Unidentified sole sp.	-	-	-	-	-	-	-	-	-	-	-	-
Unidentified rockfish	5	-	-	-	-	-	-	-	-	-	-	-
Dover sole	-	-	-	-	-	-	-	-	-	-	-	-
English sole	-	-	32	-	9	-	-	-	-	-	-	-
Flathead sole	-	-	-	-	-	-	-	-	-	-	T	-
Petrale sole	-	-	-	-	-	-	-	-	-	-	68	-
Rex sole	-	-	-	-	-	-	-	-	-	-	-	-
Rock sole	-	-	-	-	-	-	-	-	-	-	-	-
Curlfin sole	-	-	-	1	-	-	-	-	-	-	-	-
Halibut	-	-	-	-	-	-	-	1	-	-	-	-
Arrowtooth flounder	-	-	-	-	-	-	T	-	-	-	-	-
Wolf eel	-	-	-	-	-	-	-	-	-	-	-	-
Sidestripe shrimp	-	-	-	-	-	-	-	-	-	-	-	-
Smooth pink shrimp	-	-	-	-	-	-	-	-	-	-	-	-
Prawn	-	-	-	-	-	-	T	-	-	-	-	-
Squid	-	-	-	-	-	-	-	-	-	-	-	-

Table 2 (cont'd)

Set no.	25		26		27		28		29		Total	
Est. total catch (kg)	2270		2270		150		270		9090		61,350	
Duration (min)	60		60		60		60		20			
Species	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No
Lingcod	1045	158	1773	267	10	2	10	2	-	-	6026	901
Kelp greenling	-	-	-	-	-	-	-	-	-	-	-	1
Pacific hake	-	-	-	-	-	-	-	-	-	-	90	-
Walleye pollock	-	-	-	-	-	-	-	-	-	-	102	-
Spiny dogfish	-	-	-	-	-	-	14	-	-	-	6832	-
Ratfish	-	-	-	-	7	-	T	-	-	-	2222	-
Skate sp.	-	-	-	-	-	-	-	-	-	-	T	-
Northern smoothtongue	-	-	-	-	-	-	-	-	-	-	204	-
Surf smelt	-	-	-	-	-	-	-	-	-	-	T	-
Eulachon	T	-	-	-	7	-	-	-	-	-	407	-
Pacific herring	T	-	-	-	-	-	-	-	-	-	5	-
American shad	-	-	-	-	-	-	-	-	-	-	-	6
Chinook salmon	-	-	-	3	-	1	-	-	-	-	-	43
Shiner perch	-	-	-	-	-	-	-	-	-	-	T	-
Pacific cod	T	-	-	-	T	-	T	-	-	-	2325	-
Pacific tomcod	-	-	-	-	-	-	-	-	-	-	9	-
Sablefish	-	-	-	-	-	1	-	-	-	-	-	289
Canary rockfish	910	-	455	-	-	-	T	-	-	-	13320	-
Greenstriped rockfish	-	-	-	-	-	-	-	-	-	-	T	-
Redstripe rockfish	-	-	-	-	110	-	T	-	-	-	2155	-
Widow rockfish	-	-	-	-	-	-	-	-	-	-	364	-
Yelloweye rockfish	T	-	-	-	-	-	T	-	-	-	11	-
Yellowtail rockfish	T	-	-	-	7	-	T	-	T	-	3156	-
Bocaccio	114	-	-	-	-	-	T	-	-	-	4340	-
Silvergray rockfish	114	-	-	-	-	-	T	-	-	-	8256	-
Redbanded rockfish	-	-	-	-	T	-	T	-	9000	-	9000	-
Sharpchin rockfish	-	-	-	-	-	-	-	-	-	-	364	-
Pygmy rockfish	-	-	-	-	-	-	-	-	-	-	T	-
Rosethorn rockfish	-	-	-	-	-	-	-	-	-	-	T	-
Vermilion rockfish	-	-	-	-	-	-	-	-	-	-	5	3
Black rockfish	-	-	-	-	-	-	-	-	-	-	5	3
Unidentified rockfish sp.	-	-	-	-	-	-	-	-	-	-	5	-
Unidentified sole sp.	-	-	-	-	-	-	-	-	-	-	68	-
Dover sole	-	-	-	-	T	-	-	-	-	-	5	-
English sole	-	-	-	-	-	-	-	-	-	-	610	-
Flathead sole	-	-	-	-	-	-	-	-	-	-	T	-
Petrale sole	T	-	T	-	-	-	-	-	-	-	123	-
Rex sole	T	-	-	-	-	-	134	-	-	-	134	-
Rock sole	-	-	-	-	-	-	-	-	-	-	201	-
Curlfin sole	-	-	-	-	-	-	-	-	-	-	-	1
Halibut	-	2	-	-	-	-	-	-	-	-	-	9
Arrowtooth flounder	-	-	-	-	7	-	55	-	-	-	62	-
Wolf eel	-	-	-	-	-	-	-	-	-	-	-	1
Sidestripe shrimp	-	-	-	-	-	-	-	-	-	-	T	-
Smooth pink shrimp	-	-	-	-	-	-	-	-	-	-	T	-
Prawn	-	-	-	-	-	-	-	-	-	-	T	-
Squid	-	-	-	-	-	-	-	-	-	-	T	-

^aThe landed catch of lingcod was sorted and weighed. The landed catch of all other species was estimated visually. T in the table equals <1% of the total catch.

Table 3. Summary of lingcod samples collected off the west coast of Vancouver Island, M/V ARCTIC HARVESTER, November 22-December 2, 1977.

Set no.	Fork length	Maturity	Stomach contents	Dorsal fin-rays	Remarks
1	8	8	8	8	Total catch
2	4	4	4	4	"
4	7	0	0	0	"
6	6	6	6	6	"
7	5	5	5	5	"
8	2	2	2	2	"
10	124	124	124	124	"
11	53	53	0	53	"
12	4	4	4	4	"
13	1	1	1	1	"
14	36	36	0	36	"
15	36	36	0	36	"
18	1	1	1	1	"
19	1	1	1	1	"
20	1	1	1	1	"
22	7	7	7	7	"
23	4	4	0	4	"
24	172	172	0	172	"
25	158	158	0	158	"
26	267	267	0	267	"
27	2	2	0	0	"
28	2	2	0	0	"

Table 4. Age distribution and mean lengths at age of lingcod sampled off Clayoquot Sound (Sets 10, 11, 14, 15, 24, 25 and 26), M/V ARCTIC HARVESTER, November 22-December 2, 1977.

Age	Male			Female			Total		
	No. of fish	Mean length (cm)	SE ^a	No. of fish	Mean length (cm)	SE	No. of fish	Mean length (cm)	SE
2	2	53.0	0.00	15	50.5	0.58	17	50.8	0.53
3	4	58.3	1.31	16	67.1	1.11	20	65.3	0.94
4	8	62.5	2.04	49	69.8	1.04	57	68.8	0.94
5	4	64.3	1.70	125	77.8	0.56	129	77.4	0.55
6	4	68.5	2.87	248	81.8	0.31	252	81.6	0.31
7	-	-	-	200	84.7	0.38	200	84.7	0.38
8	-	-	-	97	87.5	0.72	97	87.5	0.72
9	-	-	-	28	94.7	1.60	28	94.7	1.60
10	-	-	-	5	98.2	4.08	5	98.2	4.08
11	-	-	-	13	97.8	2.94	13	97.8	2.94
12	-	-	-	3	105.7	2.33	3	105.7	2.33

^aSE = Standard error.

Table 5. Lingcod maturity stages.

A. Females

IMMATURE

I-1

Ovaries are very small in relation to the body cavity, firm, semi-transparent and pink in colour. Ova are not visible.

I-2

Ovaries are slightly enlarged but still less than one-third of the body cavity, firm, semi-transparent and pink in colour. Ova are not visible.

PRE-RIPENING

R-1

Ovaries fill about one-third of the body cavity. Ovarian blood vessels are more pronounced than immature stages. Ova are semi-transparent, orange in colour, and less than 1 mm in diameter.

R-2

Ovaries fill about two-thirds of the body cavity. Ova are opaque and orange in colour and about 1 mm in diameter.

RIPENING

IR

Ovaries fill about 80% of the body cavity. Ova are opaque and orange to white in colour and less than 2 mm in diameter.

2R

Ovaries fill the body cavity. Ova are opaque, orange to white in colour and about 2 mm in diameter.

RIPE

Ovaries fill and visibly distend the body cavity. Ova are opaque, orange to white in colour and larger than 2 mm in diameter. Ova may be loose inside the ovary.

SPENT

Ovary may be bloodshot and purple in colour. Some ova may remain in the ovary. Ovary is flaccid and about one-third to two-thirds of the body cavity.

RESORBING

Fish has not spawned, ova are large, transparent to opaque and degenerative.

RECOVERING

Ovaries returning to pre-ripening stage, moderately firm, and fill less than half the body cavity. No bloodshot appearance. Ova are small.

RESTING

Ovaries less than one-third the body cavity, firm with visible blood vessels. Stage is sometimes difficult to distinguish from I-2 immature specimens.

Table 5 (cont'd)

B. Males

IMMATURE

I-1

Testes small, white and threadlike, may be difficult to detect.

I-2

Testes slightly enlarged and appear flat on inside of body cavity. Gonad white to light brown.

PRE-RIPENING

Testes enlarged, filling less than one-quarter of the body cavity and white to brown in colour.

RIPENING

Testes are enlarged to two-thirds of the body cavity and white to brown in colour. Cross-sections of the gonad will produce milt at the centre of the tissue.

RIPE

Testes are large and full of milt.

SPENT

Testes are flaccid, reduced in size and may contain some milt.

Table 6. Length frequency by maturity state for male lingcod caught at Clayoquot Sound (sets 10, 11, 14, 15, 24, 25 and 26), M/V ARCTIC HARVESTER, November 22-December 2, 1977.

Fork length (cm)	I-1	I-2	R1-R2	1R	Total
52	1	-	-	-	1
53	1	1	-	-	2
54	0	0	-	-	0
55	0	0	-	-	0
56	2	0	-	-	2
57	0	1	-	-	1
58	0	0	-	-	0
59	0	0	-	-	0
60	0	0	2	-	2
61	1	0	1	-	2
62	-	0	2	-	2
63	-	1	1	-	2
64	-	-	0	-	0
65	-	-	0	-	0
66	-	-	0	-	0
67	-	-	4	-	4
68	-	-	1	-	1
69	-	-	0	1	1
70	-	-	0	-	0
71	-	-	0	-	0
72	-	-	0	-	0
73	-	-	2	-	2
Total	5	3	13	1	22

Table 7. Length frequency by maturity state for female lingcod caught at Clayoquot Sound (sets 10, 11, 14, 15, 24, 25 and 26) M/V ARCTIC HARVESTER, November 21-December 6, 1977.

Fork length (cm)	I ₁	I ₂	I ₂ -R ₁	R ₁	R ₁ -R ₂	R ₂	1R	2R	Ripe	Rest	Total
46	1	-	-	-	-	-	-	-	-	-	1
47	1	-	-	-	-	-	-	-	-	-	1
48	1	-	-	-	-	-	-	-	-	-	1
49	3	-	-	-	-	-	-	-	-	-	3
50	2	-	-	-	-	-	-	-	-	-	2
51	1	-	-	-	-	-	-	-	-	-	1
52	5	-	-	-	-	-	-	-	-	-	5
53	3	-	-	-	-	-	-	-	-	-	3
54	0	-	-	-	-	-	-	-	-	-	0
55	1	-	-	-	-	-	-	-	-	-	1
56	2	-	-	-	-	-	-	-	-	-	2
57	1	-	-	-	-	-	-	-	-	-	1
58	1	-	-	-	-	-	-	-	-	-	1
59	1	-	-	-	-	-	-	-	-	-	1
60	2	-	-	-	-	-	-	-	-	-	2
61	3	-	-	-	-	-	-	-	-	-	3
62	0	-	-	-	-	-	-	-	-	-	0
63	0	-	-	-	-	-	-	-	-	-	0
64	3	2	-	-	-	-	-	-	-	-	5
65	1	3	-	-	-	-	-	-	-	-	4
66	1	5	-	-	-	-	-	-	-	-	6
67	1	4	-	-	-	-	-	-	-	-	5
68	-	7	-	2	-	-	-	-	-	-	9
69	-	6	-	0	-	-	-	-	-	-	6
70	-	13	1	1	-	-	-	-	-	-	15
71	-	17	0	1	-	1	-	-	-	-	19
72	-	9	0	0	-	0	1	-	-	-	10
73	-	9	1	4	1	1	1	-	-	-	17
74	-	13	1	2	0	0	4	-	-	-	20
75	-	7	1	2	1	0	2	-	-	-	13
76	-	8	1	1	2	2	6	1	-	-	21
77	-	4	1	8	1	2	5	1	-	-	22
78	-	9	0	10	0	6	16	1	-	-	42
79	-	4	0	6	2	4	14	3	-	1	34
80	-	2	0	5	0	11	19	4	-	0	41
81	-	0	0	2	0	6	21	9	-	0	38
82	-	4	1	4	1	11	21	6	-	1	49
83	-	1	0	6	2	8	20	8	2	0	47
84	-	1	0	5	0	8	30	8	1	0	53
85	-	-	1	6	1	7	28	9	3	2	57
86	-	-	-	1	0	6	26	9	0	0	42
87	-	-	-	3	0	5	23	7	0	3	41
88	-	-	-	3	1	5	18	4	1	0	32
89	-	-	-	2	0	4	7	5	0	0	18

Table 7 (cont'd)

Fork length (cm)	I ₁	I ₂	I ₂ -R ₁	R ₁	R ₁ -R ₂	R ₂	1R	2R	Ripe	Rest	Total
90	-	-	-	2	1	2	8	1	0	1	17
91	-	-	-	1	-	1	6	3	0	1	12
92	-	-	-	0	-	1	10	3	1	1	16
93	-	-	-	0	-	1	1	6	0	0	8
94	-	-	-	1	-	0	5	1	2	1	10
95	-	-	-	0	-	0	3	0	1	0	4
96	-	-	-	0	-	0	4	3	1	1	9
97	-	-	-	0	-	0	4	4	0	0	8
98	-	-	-	0	-	0	2	5	1	0	8
99	-	-	-	1	-	1	0	2	1	0	5
100	-	-	-	0	-	1	3	2	0	0	6
101	-	-	-	0	-	0	1	2	2	2	7
102	-	-	-	0	-	0	0	3	1	0	4
103	-	-	-	0	-	0	0	0	1	0	1
104	-	-	-	0	-	0	3	1	0	1	5
105	-	-	-	0	-	0	0	2	1	-	3
106	-	-	-	1 ^a	-	0	1	0	0	-	2
107	-	-	-	-	-	0	1	0	0	-	1
108	-	-	-	-	-	0	0	0	1	-	1
109	-	-	-	-	-	0	0	0	-	-	0
110	-	-	-	-	-	1	1	0	-	-	2
111	-	-	-	-	-	0	0	0	-	-	0
112	-	-	-	-	-	0	0	0	-	-	0
113	-	-	-	-	-	1	0	0	-	-	1
114	-	-	-	-	-	-	1	0	-	-	1
115	-	-	-	-	-	-	-	0	-	-	0
116	-	-	-	-	-	-	-	0	-	-	0
117	-	-	-	-	-	-	-	1	-	-	1
Total	34	128	8	80	13	96	316	115	19	8	826

^aAbnormal gonad.

Table 8. Age frequency by maturity state for male lingcod caught at Clayoquot Sound (sets 10, 11, 14, 15, 24, 25 and 26) M/V ARCTIC HARVESTER, November 22-December 2, 1977.

Age	I ₁	I ₂	R1	R2	1R	Total
2	1	1	-	-	-	2
3	3	0	1	-	-	4
4	1	2	0	4	1	8
5	-	-	2	2	-	4
6	-	-	2	2	-	4
Total	5	3	5	8	1	22

Table 9. Age frequency by maturity state for female lingcod caught at Clayoquot Sound (sets 10, 11, 14, 15, 24, 25 and 26), M/V ARCTIC HARVESTER, November 22-December 2, 1977.

Age	I ₁	I ₂	I ₂ -R ₁	R ₁	R ₁ -R ₂	R ₂	1R	2R	Ripe	Resting	Total
2	15	-	-	-	-	-	-	-	-	-	15
3	5	10	-	-	-	-	1	-	-	-	16
4	9	29	-	5	-	2	4	-	-	-	49
5	3	39	4	19	1	13	31	14	1	-	125
6	1	28	3	28	8	35	112	27	4	2	248
7	-	13	0	18	2	27	99	33	2	6	200
8	-	2	1	8	4	12	42	20	6	2	97
9	-	0	1	4	2	2	9	6	2	2	28
10	-	0	-	0	-	0	2	2	1	-	5
11	-	1	-	2	-	1	3	4	2	-	13
12	-	-	-	-	-	1	1	1	-	-	3
Total	33	122	9	84	17	93	304	107	18	12	799

Table 10. Number and percent at length at maturity for male lingcod caught at Clayoquot Sound (sets 10, 11, 14, 15, 24, 25 and 26), M/V ARCTIC HARVESTER, November 22-December 2, 1977.

Fork length (cm)	Immature	Mature	Total	% Mature
52	1	0	1	0.0
53	2	0	2	0.0
54	0	0	0	-
55	0	0	0	-
56	2	0	2	0.0
57	1	0	1	0.0
58	0	0	0	-
59	0	0	0	-
60	0	2	2	100.0
61	1	1	2	50.0
62	0	2	2	100.0
63	1	1	2	50.0
64	-	0	0	-
65	-	0	0	-
66	-	0	0	-
67	-	4	4	100.0
68	-	1	1	100.0
69	-	1	1	100.0
70	-	0	0	-
71	-	0	0	-
72	-	0	0	-
73	-	2	2	100.0

Table 11. Number and percentage at length at maturity for female lingcod caught at Clayoquot Sound (sets 10, 11, 14, 15, 24, 25 and 26), M/V ARCTIC HARVESTER, November 22-December 2, 1977.

Fork length (cm)	Immature	Mature	Total	% Mature
46	1	-	1	0.0
47	1	-	1	0.0
48	1	-	1	0.0
49	3	-	3	0.0
50	2	-	2	0.0
51	1	-	1	0.0
52	5	-	5	0.0
53	3	-	3	0.0
54	0	-	0	-
55	1	-	1	0.0
56	2	-	2	0.0
57	1	-	1	0.0
58	1	-	1	0.0
59	1	-	1	0.0
60	2	-	2	0.0
61	3	-	3	0.0
62	0	-	0	-
63	0	-	0	-
64	5	-	5	0.0
65	4	-	4	0.0
66	6	-	6	0.0
67	4	-	4	0.0
68	7	2	7	28.5
69	6	0	6	0.0
70	13	1	14	7.1
71	17	2	19	10.5
72	9	1	10	10.0
73	9	7	16	43.8
74	13	6	19	31.6
75	7	5	12	41.7
76	8	12	20	60.0
77	4	17	21	81.0
78	9	33	42	78.6
79	4	30	34	88.2
80	2	39	41	95.1
81	0	38	38	100.0
82	4	44	48	91.7
83	1	46	47	97.9
84	1	52	53	98.1
85	-	56	56	100.0
86	-	42	42	100.0
87	-	41	41	100.0
88	-	32	32	100.0
89	-	18	18	100.0

Table 11 (cont'd)

Fork length (cm)	Immature	Mature	Total	% Mature
90	-	17	17	100.0
91	-	12	12	100.0
92	-	16	16	100.0
93	-	8	8	100.0
94	-	10	10	100.0
95	-	4	4	100.0
96	-	9	9	100.0
97	-	8	8	100.0
98	-	8	8	100.0
99	-	5	5	100.0
100	-	6	6	100.0
101	-	7	7	100.0
102	-	4	4	100.0
103	-	1	1	100.0
104	-	5	5	100.0
105	-	3	3	100.0
106	-	2	2	100.0
107	-	1	1	100.0
108	-	1	1	100.0
109	-	0	0	-
110	-	2	2	100.0
111	-	0	0	-
112	-	0	0	-
113	-	1	1	100.0
114	-	1	1	100.0
115	-	0	0	-
116	-	0	0	-
117	-	1	1	100.0

Table 12. Number and percentage at age at maturity for male lingcod caught at Clayoquot Sound (sets 10, 11, 14, 15, 24, 25 and 26), M/V ARCTIC HARVESTER, November 22-December 2, 1977.

Age	Immature	Mature	Total	% Mature
2	2	-	2	0.0
3	3	1	4	25.0
4	3	5	8	62.5
5	-	4	4	100.0
6	-	4	4	100.0

Table 13. Number and percentage at age at maturity for female lingcod caught at Clayoquot Sound (sets 10, 11, 14, 15, 24, 25 and 26), M/V ARCTIC HARVESTER, November 22-December 2, 1977.

Age	Immature	Mature	Total	% Mature
2	15	0	15	0.0
3	15	1	16	6.3
4	38	11	49	22.4
5	42	79	121	65.3
6	29	216	245	88.2
7	13	187	200	93.5
8	2	94	96	97.9
9	0	27	27	100.0
10	0	5	5	100.0
11	1	10	11	90.9
12	-	3	3	100.0

Table 14. Summary of species sampled other than lingcod, M/V ARCTIC HARVESTER, November 22-December 2, 1977.

Species	Set no.	Fork length	Age structure	Remarks
Sablefish	1	86	86	Total catch
	2	96	96	"
	4	6	6	"
	6	91	91	"
Pollock	4	177	0	Total catch
Redstripe rockfish	8	141	0	Total catch
Redbanded rockfish	29	191	0	Random sample
Chinook salmon	1	21	0	Total catch
	2	16	0	"
	4	1	0	"
	6	2	0	"
	7	4	0	"
	8	13	0	"
	14	1	0	"
	17	1	0	"
	26	2	0	"
	27	1	0	"
Halibut	1	2	0	Total catch
	2	1	0	"
	7	1	0	"
	15	1	0	"
	17	1	0	"
	22	1	0	"

Table 15. Length frequency of sablefish by set off the west coast of Vancouver Island, M/V ARCTIC HARVESTER, November 22-December 2, 1977.

Set no.	1			2			4			6			Total		
Fork length (cm)	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
21	-	-	-	1	-	1	-	-	-	-	-	-	1	-	1
22	6	3	9	5	1	6	-	-	-	1	1	2	12	5	17
23	12	8	20	10	6	16	-	-	-	2	2	4	24	16	40
24	8	6	14	13	11	24	-	-	-	9	8	17	30	25	55
25	9	3	12	7	3	10	2	1	3	11	5	16	29	12	41
26	5	3	8	7	6	13	0	0	0	9	8	17	21	17	38
27	7	4	11	5	2	7	0	0	0	8	9	17	20	15	35
28	2	2	4	2	2	4	0	1	1	6	6	12	10	11	21
29	3	1	4	1	1	2	1	1	2	2	3	5	7	6	13
30	-	0	0	4	0	4	-	-	-	-	1	1	4	1	5
31	-	1	1	0	0	0	-	-	-	-	-	-	0	1	1
32	-	-	-	1	0	1	-	-	-	-	-	-	1	0	1
33	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
34	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
35	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
36	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
37	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
38	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
39	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
40	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
41	-	-	-	0	1	1	-	-	-	-	-	-	0	1	1
42	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
43	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
44	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
45	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
46	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
47	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
48	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
49	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
50	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
51	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
52	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
53	-	-	-	0	1	1	-	-	-	-	-	-	0	1	1
54	-	-	-	0	1	1	-	-	-	-	-	-	0	1	1
55	-	-	-	0	1	1	-	-	-	-	-	-	0	1	1
56	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
57	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
58	-	-	-	0	0	0	-	-	-	-	-	-	0	0	0
59	-	-	-	0	2	2	-	-	-	-	-	-	0	2	2
60	-	-	-	0	-	0	-	-	-	-	-	-	0	-	0
61	-	-	-	1	-	1	-	-	-	-	-	-	1	-	1
Total	52	31	83	57	38	95	3	3	6	48	43	91	160	115	275

Table 16. Length frequency of walleye pollock off the west coast of Vancouver Island, M/V ARCTIC HARVESTER, November 22-December 2, 1977.

Set no. Fork length (cm)	4		
	M	F	T
24	2	-	2
25	4	3	7
26	3	3	6
27	0	3	3
28	5	6	11
29	4	6	10
30	4	3	7
31	8	1	9
32	4	0	4
33	7	5	12
34	14	7	21
35	7	6	13
36	5	8	13
37	0	4	4
38	1	5	6
39	2	2	4
40	2	0	2
41	1	1	2
42	0	4	4
43	0	3	3
44	0	1	1
45	0	1	1
46	0	0	0
47	0	2	2
48	1	0	1
49	-	1	1
50	-	1	1
51	-	2	2
52	-	0	0
53	-	0	0
54	-	0	0
55	-	0	0
56	-	1	1
57	-	0	0
58	-	1	1
Total	74	80	154

Table 17. Length frequency of rockfish by set off the west coast of Vancouver Island, M/V ARCTIC HARVESTER, November 22-December 2, 1977.

Redstripe				Redbanded			
Set no. Fork length (cm)	8			Set no. Fork length (cm)	29		
	M	F	T		M	F	T
23	4	2	6	42	1	1	2
24	7	1	8	43	0	1	1
25	23	3	26	44	4	2	6
26	19	13	32	45	3	2	5
27	10	21	31	46	7	6	13
28	5	20	25	47	5	1	6
29	-	7	7	48	6	5	11
30	-	2	2	49	16	7	23
31	-	3	3	50	16	9	25
32	-	0	0	51	24	8	32
33	-	0	0	52	5	9	14
34	-	1	1	53	4	5	9
Total	68	73	141	54	1	11	12
				55	1	8	9
				56	-	9	9
				57	-	4	4
				58	-	7	7
				59	-	1	1
				60	-	0	0
				61	-	2	2
				Total	93	98	191

Table 18. Length frequency of chinook salmon by set off the west coast of Vancouver Island, M/V ARCTIC HARVESTER, November 22-December 2, 1977.

Set no. Fork length (cm)	1			2			4			6		
	M	F	T	M	F	T	M	F	T	M	F	T
51	-	-	-	-	-	-	1	-	-	-	-	-
52	1	-	1	-	-	-	-	-	-	-	-	-
53	0	-	0	-	-	-	-	-	-	-	-	-
54	0	-	0	-	-	-	-	-	-	-	-	-
55	0	-	0	-	-	-	-	-	-	-	-	-
56	0	-	0	-	-	-	-	-	-	-	-	-
57	1	-	1	-	1	1	-	-	-	-	-	-
58	1	1	2	1	0	1	-	-	-	-	-	-
59	0	1	1	0	0	0	-	-	-	-	-	-
60	0	0	0	0	0	0	-	-	-	-	-	-
61	0	1	1	1	0	1	-	-	-	-	1	1
62	0	0	0	0	1	1	-	-	-	-	-	0
63	1	1	2	0	0	0	-	-	-	-	-	0
64	0	2	2	0	0	0	-	-	-	-	-	0
65	0	0	0	1	2	3	-	-	-	-	-	0
66	2	1	3	0	0	0	-	-	-	-	-	0
67	1	0	1	0	1	1	-	-	-	1	-	1
68	1	1	2	1	0	1	-	-	-	-	-	-
69	0	2	2	0	0	0	-	-	-	-	-	-
70	0	1	1	0	1	1	-	-	-	-	-	-
71	0	0	0	1	0	1	-	-	-	-	-	-
72	0	0	0	0	3	3	-	-	-	-	-	-
73	0	1	1	0	0	0	-	-	-	-	-	-
74	1	-	1	1	0	1	-	-	-	-	-	-
75	-	-	-	-	0	0	-	-	-	-	-	-
76	-	-	-	-	1	1	-	-	-	-	-	-
Total	9	12	21	6	10	16	1	-	-	1	1	2

Table 18 (cont'd)

Set no. Fork length (cm)	7			8			14			17		
	M	F	T	M	F	T	M	F	T	M	F	T
51	1	-	1	1	1	2	-	-	-	-	-	-
52	0	-	0	0	0	0	-	-	-	-	-	-
53	0	-	0	1	0	1	-	-	-	-	-	-
54	0	1	1	0	1	1	-	-	-	-	-	-
55	0	-	0	0	0	0	-	-	-	-	-	-
56	0	-	0	0	0	0	-	-	-	-	-	-
57	0	-	0	2	1	3	-	-	-	1	-	1
58	0	-	0	1	0	1	-	-	-	-	-	-
59	0	-	0	0	1	1	-	-	-	-	-	-
60	0	-	0	1	-	1	-	-	-	-	-	-
61	0	-	0	-	-	-	-	-	-	-	-	-
62	0	-	0	-	-	-	-	-	-	-	-	-
63	0	-	0	-	-	-	-	-	-	-	-	-
64	0	-	0	-	-	-	-	-	-	-	-	-
65	0	-	0	-	-	-	-	-	-	-	-	-
66	0	-	0	-	-	-	-	-	-	-	-	-
67	1	-	1	-	-	-	-	-	-	-	-	-
68	0	-	0	-	-	-	-	-	-	-	-	-
69	0	-	0	-	-	-	-	-	-	-	-	-
70	0	-	0	-	-	-	-	1	1	-	-	-
71	0	-	0	-	-	-	-	-	-	-	-	-
72	0	-	0	-	-	-	-	-	-	-	-	-
73	0	-	0	-	-	-	-	-	-	-	-	-
74	1	-	1	-	-	-	-	-	-	-	-	-
75	-	-	-	-	-	-	-	-	-	-	-	-
76	-	-	-	-	-	-	-	-	-	-	-	-
Total	3	1	4	6	4	10	-	1	1	1	-	1

Table 18 (cont'd)

Set no. Fork length (cm)	26			27			Total		
	M	F	T	M	F	T	M	F	T
51	-	-	-	-	-	-	3	1	4
52	-	-	-	-	-	-	1	0	1
53	-	-	-	-	-	-	1	0	1
54	-	-	-	-	-	-	0	2	2
55	-	-	-	-	-	-	0	0	0
56	-	-	-	-	-	-	0	0	0
57	-	-	-	-	-	-	4	2	6
58	-	-	-	-	-	-	3	1	4
59	-	-	-	-	-	-	0	2	2
60	-	-	-	-	-	-	1	0	1
61	-	-	-	-	-	-	1	2	3
62	-	-	-	-	-	-	0	1	1
63	-	-	-	-	-	-	1	1	2
64	-	-	-	-	-	-	0	2	2
65	-	-	-	1	-	1	2	2	4
66	-	1	1	-	-	-	2	2	4
67	-	0	0	-	-	-	3	1	4
68	-	0	0	-	-	-	2	1	3
69	-	0	0	-	-	-	0	2	2
70	-	0	0	-	-	-	0	3	3
71	-	0	0	-	-	-	1	0	1
72	-	0	0	-	-	-	0	3	3
73	-	1	1	-	-	-	0	2	2
74	-	-	-	-	-	-	2	0	2
75	-	-	-	-	-	-	1	0	1
76	-	-	-	-	-	-	0	1	1
Total	-	2	2	1	-	1	28	31	59

Table 19. Length frequency of halibut by set off the west coast of Vancouver Island, M/V ARCTIC HARVESTER, November 22-December 2, 1977.

Set no. Fork length (cm)	1	2	7	15	17	22	Total		
	F	M	F	F	F	M	M	F	T
68	-	-	-	1	-	-	-	1	1
69	-	-	-	-	1	-	-	1	1
70	-	1	-	-	-	-	1	0	1
71	-	-	-	-	-	-	0	0	0
72	-	-	-	-	-	-	0	0	0
73	-	-	-	-	-	-	0	0	0
74	-	-	-	-	-	-	0	0	0
75	-	-	-	-	-	-	0	0	0
76	-	-	-	-	-	1	1	0	1
77	-	-	-	-	-	-	-	0	0
78	-	-	-	-	-	-	-	0	0
79	-	-	1	-	-	-	-	1	1
80	-	-	-	-	-	-	-	0	0
81	-	-	-	-	-	-	-	0	0
82	-	-	-	-	-	-	-	0	0
83	-	-	-	-	-	-	-	0	0
84	-	-	-	-	-	-	-	0	0
85	-	-	-	-	-	-	-	0	0
86	-	-	-	-	-	-	-	0	0
87	-	-	-	-	-	-	-	0	0
88	-	-	-	-	-	-	-	0	0
89	-	-	-	-	-	-	-	0	0
90	-	-	-	-	-	-	-	0	0
91	-	-	-	-	-	-	-	0	0
92	-	-	-	-	-	-	-	0	0
93	-	-	-	-	-	-	-	0	0
94	-	-	-	-	-	-	-	0	0
95	-	-	-	-	-	-	-	0	0
96	-	-	-	-	-	-	-	0	0
97	-	-	-	-	-	-	-	0	0
98	-	-	-	-	-	-	-	0	0
99	-	-	-	-	-	-	-	0	0
100	-	-	-	-	-	-	-	0	0
101	-	-	-	-	-	-	-	0	0
102	-	-	-	-	-	-	-	0	0
103	-	-	-	-	-	-	-	0	0
104	-	-	-	-	-	-	-	0	0
105	-	-	-	-	-	-	-	0	0
106	-	-	-	-	-	-	-	0	0
107	-	-	-	-	-	-	-	0	0
108	-	-	-	-	-	-	-	0	0
109	-	-	-	-	-	-	-	0	0
110	1	-	-	-	-	-	-	1	1
111	0	-	-	-	-	-	-	0	0

Table 19 (cont'd)

Set no. Fork length (cm)	1	2	7	15	17	22	Total		
	F	M	F	F	F	M	M	F	T
112	0	-	-	-	-	-	-	0	0
113	0	-	-	-	-	-	-	0	0
114	0	-	-	-	-	-	-	0	0
115	0	-	-	-	-	-	-	0	0
116	0	-	-	-	-	-	-	0	0
117	0	-	-	-	-	-	-	0	0
118	0	-	-	-	-	-	-	0	0
119	1	-	-	-	-	-	-	1	1
Total	2	1	1	1	1	1	2	5	7



Fig. 1. Set locations, M/V ARCTIC HARVESTER, November 22-December 2, 1977.

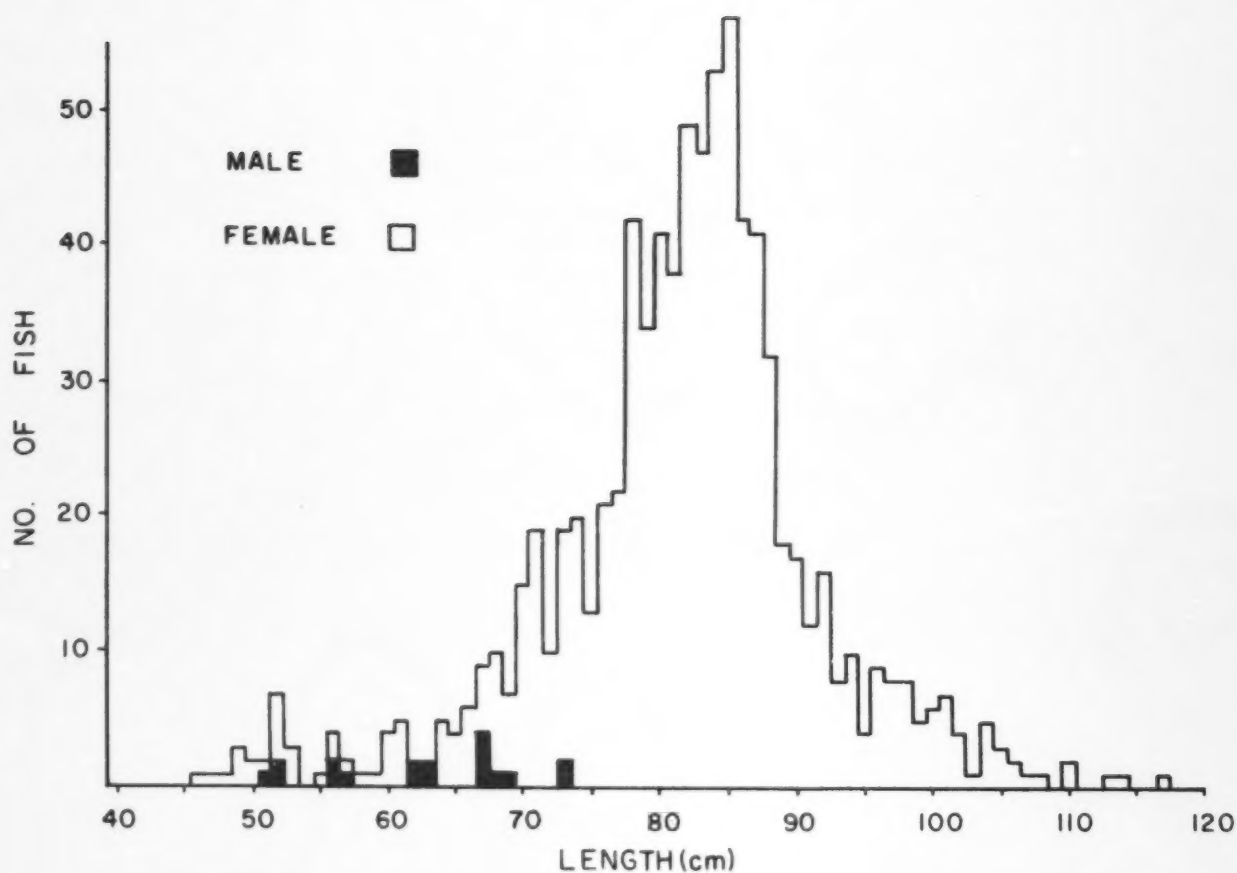


Fig. 2. Length frequency distributions of lingcod caught off Clayoquot Sound (sets 10, 11, 14, 15, 24, 25, and 26), M/V ARCTIC HARVESTER, November 22-December 2, 1977.

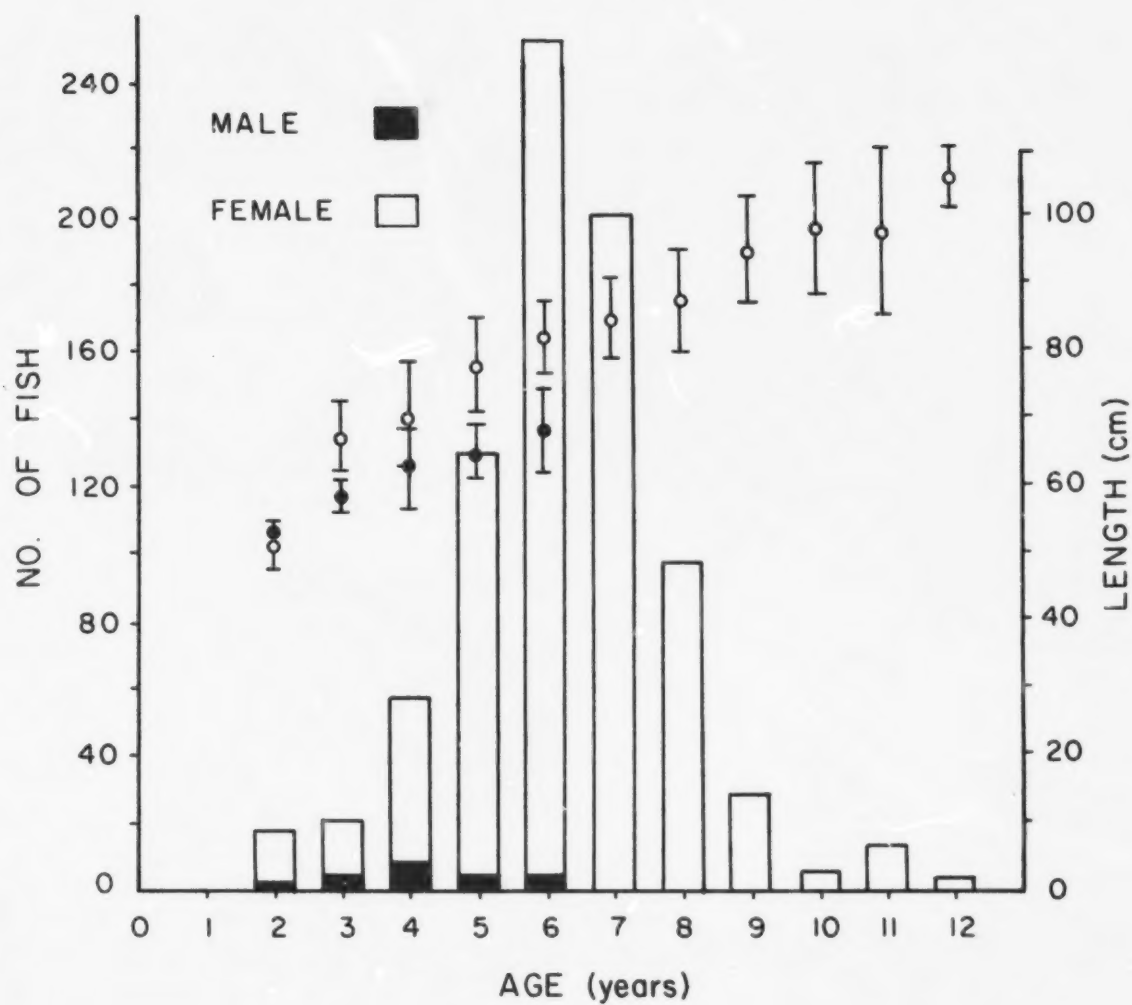


Fig. 3. Age distributions and growth (showing standard deviations) of lingcod caught off Clayoquot Sound (sets 10, 11, 14, 15, 25 and 26), M/V ARCTIC HARVESTER, November 22-December 2, 1977.

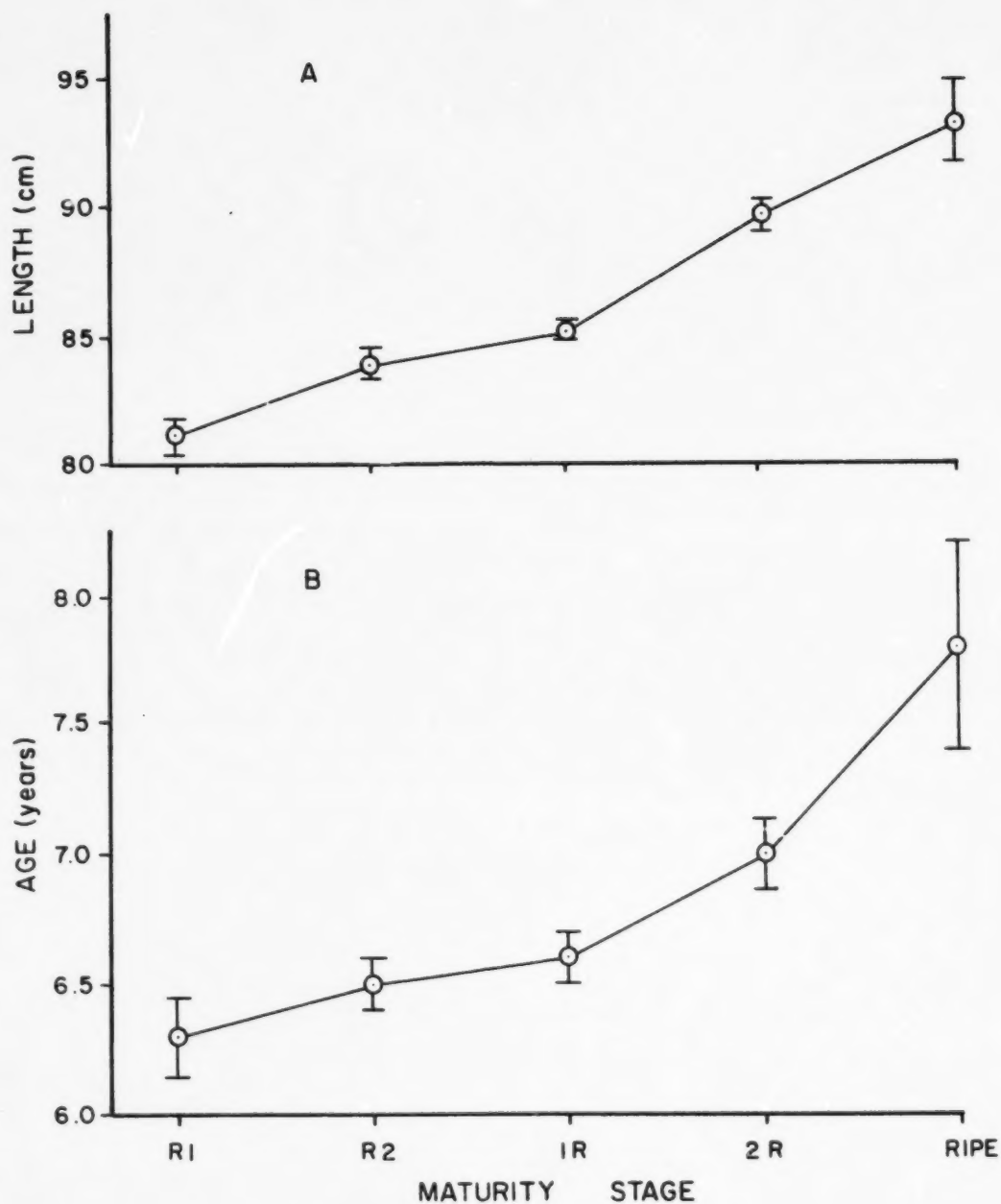
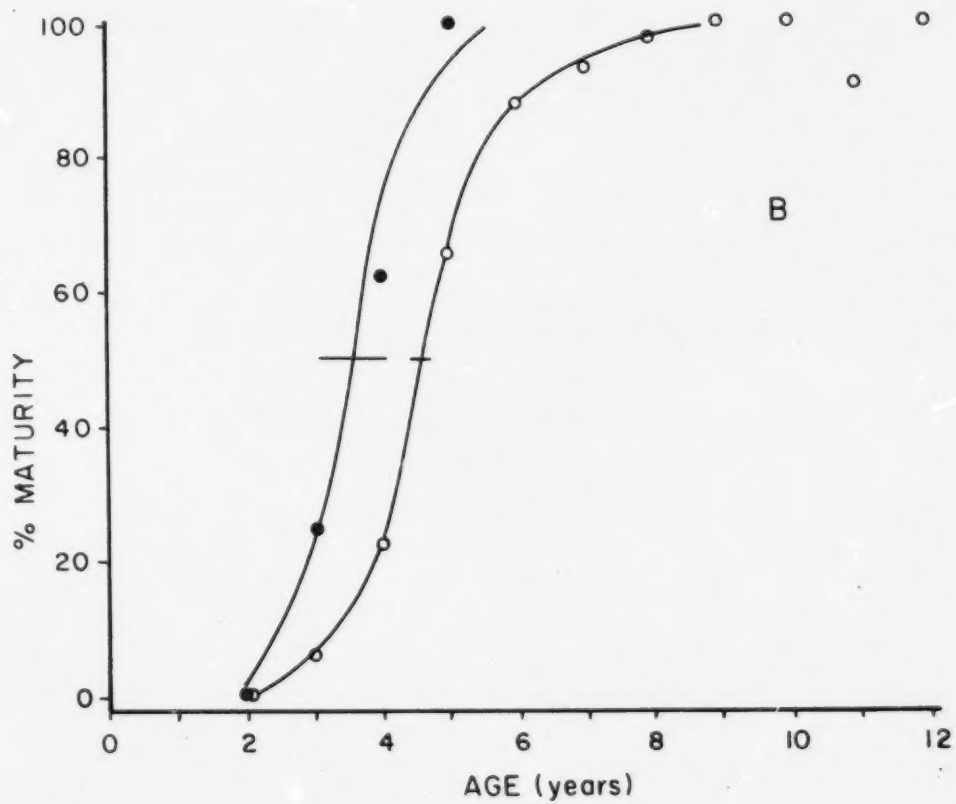
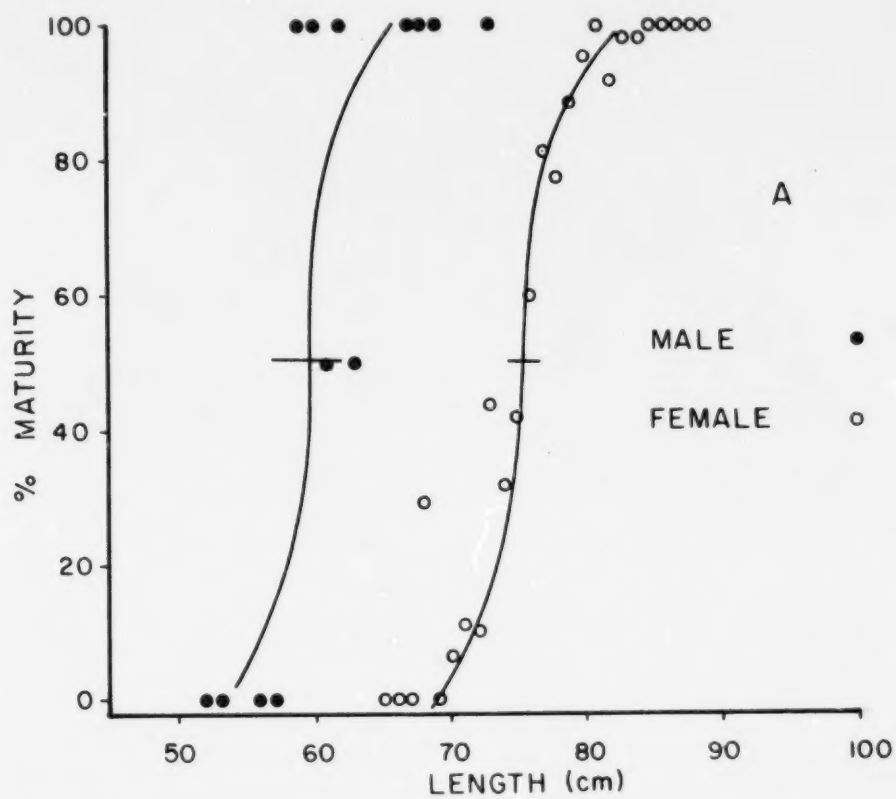


Fig. 4. Relationship between stage of maturity and (A) mean length and (B) mean age (showing standard error) of maturing female lingcod caught off Clayoquot Sound, M/V ARCTIC HARVESTER, November 22-December 2, 1977.

Fig. 5. Relationship between percent maturity (A) at length and (B) at age for lingcod caught off Clayoquot Sound, M/V ARCTIC HARVESTER, November 22-December 2, 1977. Horizontal lines show the length and age at 50% maturity and the 95% confidence limits estimated using probit analysis.



Appendix 1. Set information, M/V ARCTIC HARVESTER, November 22-December 2, 1977.

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 22 SET/HAUL NO. 1
LOCATION: FORTY-MILE BANK AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 48°30.1'N Long. 125°37.0'W
END: Lat. 48°32.0'N Long. 125°32.0'W
GEAR: EBT^a START TIME (PST): 1125 DURATION (min): 60
BOTTOM DEPTH (m): START: 101 END: 84 EST. AV. DEPTH: 91
NET DEPTH RANGE m: - EST. AV. DEPTH: -
DIRECTION OF SET °true: 32 SPEED kn: 3.5 DISTANCE TRAVELLED km: 5.6
SET ON: PRE-SELECTED WATER CONDITION: - TIDE: EBB
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 22 SET/HAUL NO. 2
LOCATION: FORTY-MILE BANK AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 48°32.0'N Long. 125°32.0'W
END: Lat. 48°30.1'N Long. 125°37.0'W
GEAR: EBT START TIME (PST): 1335 DURATION (min): 60
BOTTOM DEPTH (m): START: 101 END: 91 EST. AV. DEPTH: 101
NET DEPTH RANGE m: - EST AV. DEPTH: -
DIRECTION OF SET °true: 212 SPEED kn: - DISTANCE TRAVELLED km: 5.6
SET ON: - WATER CONDITION: - TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Appendix 1 (cont'd)

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 22 SET/HAUL NO. 3
LOCATION: S.W. CORNER-BIG BANK AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 48°43.5'N Long. 125°46.2'W
END: Lat. 48°40.2'N Long. 125°45.0'W
GEAR: EBT START TIME (PST) : 1625 DURATION (min): 25
BOTTOM DEPTH (m): START: 115 END: 90 EST. AV. DEPTH: 101
NET DEPTH RANGE m: - EST. AV. DEPTH: -
DIRECTION OF SET *true: 135 SPEED kn: - DISTANCE TRAVELLED km: 7-6
SET ON: - WATER CONDITION: - TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 23 SET/HAUL NO. 4
LOCATION: AMPHITRITE POINT AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 48°55.2'N Long. 125°34.8'W
END: Lat. 48°53.6'N Long. 125°34.4'W
GEAR: EBT START TIME (PST) : 1800 DURATION (min): 45
BOTTOM DEPTH (m): START: 117 END: 90 EST. AV. DEPTH: 101
NET DEPTH RANGE m: - EST AV. DEPTH: -
DIRECTION OF SET *true: 154 SPEED kn: 3.9 DISTANCE TRAVELLED km: 5.9
SET ON: - WATER CONDITION: SWELL TIDE: FLOOD
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Appendix 1 (cont'd)

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 23 SET/HAUL NO. 5
LOCATION: W. LA PÉROUSE BANK AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 48°42.0'N Long. 125°58.0'W
END: Lat. 48°39.8'N Long. 125°54.6'W
GEAR: EBT START TIME (PST) : 1115 DURATION (min): 80
BOTTOM DEPTH (m): START: 90 END: 90 EST. AV. DEPTH: 90
NET DEPTH RANGE m: - EST. AV. DEPTH: -
DIRECTION OF SET °true: 115 SPEED kn: 3.1 DISTANCE TRAVELLED km: 5.6
SET ON: PRE-SELECTED WATER CONDITION: SWELL-CHOP TIDE: EBB
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 24 SET/HAUL NO. 6
LOCATION: FIRING RANGE AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 48°54.8'N Long. 125°40.0'W
END: Lat. 48°52.8'N Long. 125°32.8'W
GEAR: EBT START TIME (PST) : 0815 DURATION (min): 105
BOTTOM DEPTH (m): START: 77 END: 81 EST. AV. DEPTH: 81
NET DEPTH RANGE m: - EST AV. DEPTH: -
DIRECTION OF SET °true: 270 SPEED kn: - DISTANCE TRAVELLED km: 9.3
SET ON: PRE-SELECTED WATER CONDITION: - TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Appendix 1 (cont'd)

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 24 SET/HAUL NO. 7
LOCATION: S.W. CORNER BIG BANK AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 48°45.4'N Long. 125°47.8'W
END: Lat. 48°44.2'N Long. 125°49.5'W
GEAR: EBT START TIME (PST) : 1145 DURATION (min): 60
BOTTOM DEPTH (m): START: 82 END: 91 EST. AV. DEPTH: 82
NET DEPTH RANGE m: - EST. AV. DEPTH: -
DIRECTION OF SET *true: 202 SPEED kn: - DISTANCE TRAVELLED km: 5.0
SET ON: - WATER CONDITION: SWELL TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 24 SET/HAUL NO. 8
LOCATION: S.W. CORNER BIG BANK AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 48°44.0'N Long. 125°48.1'W
END: Lat. 48°40.8'N Long. 125°50.9'W
GEAR: EBT START TIME (PST) : 1335 DURATION (min): 60
BOTTOM DEPTH (m): START: 128 END: 134 EST. AV. DEPTH: 134
NET DEPTH RANGE m: - EST AV. DEPTH: -
DIRECTION OF SET *true: 188 SPEED kn: - DISTANCE TRAVELLED km: 3.7
SET ON: - WATER CONDITION: SWELL TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Appendix 1 (cont'd)

Yr Mo. Day

VESSEL: ARCTIC HARVESTER DATE: 77 11 24 SET/HAUL NO. 9

LOCATION: N.W. SIDE FIRING RANGE AREA: WEST COAST VANCOUVER ISLAND

START: Lat. 48°52.6'N Long. 125°46.0'W

END: Lat. 48°50.7'N Long. 125°43.0'W

GEAR: EBT START TIME (PST) : 1600 DURATION (min): 45

BOTTOM DEPTH (m): START: 82 END: 106 EST. AV. DEPTH: 91

NET DEPTH RANGE m: - EST. AV. DEPTH: -

DIRECTION OF SET °true: 118 SPEED kn: - DISTANCE TRAVELLED km: 3.9

SET ON: PRE-SELECTED WATER CONDITION: SWELL TIDE: -

WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.

TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Yr Mo. Day

VESSEL: ARCTIC HARVESTER DATE: 77 11 25 SET/HAUL NO. 10

LOCATION: CLAYOQUOT SOUND AREA: WEST COAST VANCOUVER ISLAND

START: Lat. 49°05.0'N Long. 126°40.2'W

END: Lat. 49°06.8'N Long. 126°42.0'W

GEAR: EBT START TIME (PST) : 1250 DURATION (min): 60

BOTTOM DEPTH (m): START: 155 END: 159 EST. AV. DEPTH: 157

NET DEPTH RANGE m: - EST AV. DEPTH: -

DIRECTION OF SET °true: 304 SPEED kn: - DISTANCE TRAVELLED km: 3.9

SET ON: - WATER CONDITION: SLIGHT SWELL TIDE: EBB

WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.

TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Appendix 1 (cont'd)

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 26 SET/HAUL NO. 11
LOCATION: CLAYOQUOT SOUND AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 49°06.4'N Long. 126°42.6'W
END: Lat. 49°04.7'N Long. 126°39.5'W
GEAR: EBT START TIME (PST) : 1530 DURATION (min): 60
BOTTOM DEPTH (m): START: 146 END: 146 EST. AV. DEPTH: 146
NET DEPTH RANGE m: - EST. AV. DEPTH: -
DIRECTION OF SET *true: 112 SPEED kn: - DISTANCE TRAVELLED km: 5.0
SET ON: - WATER CONDITION: - TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 26 SET/HAUL NO. 12
LOCATION: CLAYOQUOT SOUND AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 49°15.5'N Long. 126°23.9'W
END: Lat. 49°15.9'N Long. 126°25.0'W
GEAR: EBT START TIME (PST) : 0815 DURATION (min): 30
BOTTOM DEPTH (m): START: 62 END: 62 EST. AV. DEPTH: 62
NET DEPTH RANGE m: - EST AV. DEPTH: -
DIRECTION OF SET *true: 295 SPEED kn: - DISTANCE TRAVELLED km: 3.7
SET ON: - WATER CONDITION: - TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Appendix 1 (cont'd)

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 26 SET/HAUL NO. 13
LOCATION: CLAYOQUOT SOUND AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 49°11.2'N Long. 126°32.8'W
END: Lat. 49°12.7'N Long. 126°35.0'W
GEAR: EBT START TIME (PST) : 0950 DURATION (min): 30
BOTTOM DEPTH (m): START: 113 END: 113 EST. AV. DEPTH: 113
NET DEPTH RANGE m: - EST. AV. DEPTH: -
DIRECTION OF SET °true: 306 SPEED kn: 3.0 DISTANCE TRAVELLED km: 4.4
SET ON: PRE-SELECTED WATER CONDITION: SWELL TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 26 SET/HAUL NO. 14
LOCATION: CLAYOQUOT SOUND AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 49°02.2'N Long. 126°38.0'W
END: Lat. 49°03.4'N Long. 126°42.0'W
GEAR: EBT START TIME (PST) : 1235 DURATION (min): 60
BOTTOM DEPTH (m): START: 163 END: 162 EST. AV. DEPTH: 162
NET DEPTH RANGE m: - EST AV. DEPTH: -
DIRECTION OF SET °true: 276 SPEED kn: - DISTANCE TRAVELLED km: 4.1
SET ON: PRE-SELECTED WATER CONDITION: SWELL TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Appendix 1 (cont'd)

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 26 SET/HAUL NO. 15
LOCATION: CLAYOQUOT SOUND AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 49°02.2'N Long. 126°43.9'W
END: Lat. 49°04.5'N Long. 126°46.4'W
GEAR: EBT START TIME (PST) : 1425 DURATION (min): 30
BOTTOM DEPTH (m): START: 187 END: 187 EST. AV. DEPTH: 187
NET DEPTH RANGE m: - EST. AV. DEPTH: -
DIRECTION OF SET *true: 302 SPEED kn: - DISTANCE TRAVELLED km: 5.6
SET ON: - WATER CONDITION: - TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 27 SET/HAUL NO. 16
LOCATION: EWIN INLET AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 49°35.0'N Long. 126°35.5'W
END: Lat. 49°33.2'N Long. 126°36.0'W
GEAR: EBT START TIME (PST) : 0820 DURATION (min): 60
BOTTOM DEPTH (m): START: 97 END: 88 EST. AV. DEPTH: 97
NET DEPTH RANGE m: - EST AV. DEPTH: -
DIRECTION OF SET *true: 173 SPEED kn: 3.3 DISTANCE TRAVELLED km: 4.1
SET ON: - WATER CONDITION: SWELL TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Appendix 1 (cont'd)

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 27 SET/HAUL NO. 17
LOCATION: BAJO REEF AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 49°32.6'N Long. 126°42.2'W
END: Lat. 49°34.3'N Long. 126°39.5'W
GEAR: EBT START TIME (PST) : 1125 DURATION (min): 60
BOTTOM DEPTH (m): START: 46 END: 46 EST. AV. DEPTH: 38
NET DEPTH RANGE m: - EST. AV. DEPTH: -
DIRECTION OF SET *true: 24 SPEED kn: 3.4 DISTANCE TRAVELLED km: 5.3
SET ON: - WATER CONDITION: SWELL TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 27 SET/HAUL NO. 18
LOCATION: ESCALANTE ROCKS AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 49°29.4'N Long. 126°36.0'W
END: Lat. 49°30.2'N Long. 126°35.8'W
GEAR: EBT START TIME (PST) : 1325 DURATION (min): 10
BOTTOM DEPTH (m): START: 33 END: 33 EST. AV. DEPTH: 33
NET DEPTH RANGE m: - EST AV. DEPTH: -
DIRECTION OF SET *true: 344 SPEED kn: - DISTANCE TRAVELLED km: 4.1
SET ON: - WATER CONDITION: - TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Appendix 1 (cont'd)

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 27 SET/HAUL NO. 19
LOCATION: CENTER NOOTKA SOUND AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 49°29.0'N Long. 126°38.5'W
END: Lat. 49°28.4'N Long. 126°37.5'W
GEAR: EBT START TIME (PST): 1455 DURATION (min): 5
BOTTOM DEPTH (m): START: 38 END: 38 EST. AV. DEPTH: 38
NET DEPTH RANGE m: - EST. AV. DEPTH: -
DIRECTION OF SET °true: 123 SPEED kn: - DISTANCE TRAVELLED km: 3.7
SET ON: PRE-SELECTED WATER CONDITION: SWELL TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 28 SET/HAUL NO. 20
LOCATION: NOOTKA SOUND AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 49°26.4'N Long. 126°47.5'W
END: Lat. 49°25.2'N Long. 126°46.0'W
GEAR: EBT START TIME (PST): 0850 DURATION (min): 30
BOTTOM DEPTH (m): START: 91 END: 91 EST. AV. DEPTH: 91
NET DEPTH RANGE m: - EST AV. DEPTH: -
DIRECTION OF SET °true: 112 SPEED kn: - DISTANCE TRAVELLED km: 3.7
SET ON: PRE-SELECTED WATER CONDITION: CHOP-SWELL TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Appendix 1 (cont'd)

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 29 SET/HAUL NO. 21
LOCATION: NOOTKA SOUND AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 49°28.2'N Long. 126°57.0'W
END: Lat. 49°28.5'N Long. 127°0.0'W
GEAR: EBT START TIME (PST) : 0830 DURATION (min): 30
BOTTOM DEPTH (m): START: 115 END: 119 EST. AV. DEPTH: 117
NET DEPTH RANGE m: - EST. AV. DEPTH: -
DIRECTION OF SET °true: 260 SPEED kn: - DISTANCE TRAVELLED km: 3.9
SET ON: PRE-SELECTED WATER CONDITION: SWELL TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 29 SET/HAUL NO. 22
LOCATION: ESPERANZA INLET AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 49°27.1'N Long. 127°11.3'W
END: Lat. 49°29.0'N Long. 127°14.0'W
GEAR: EBT START TIME (PST) : 1040 DURATION (min): 60
BOTTOM DEPTH (m): START: 155 END: 152 EST. AV. DEPTH: 153
NET DEPTH RANGE m: - EST AV. DEPTH: -
DIRECTION OF SET °true: 302 SPEED kn: - DISTANCE TRAVELLED km: 4.6
SET ON: PRE-SELECTED WATER CONDITION: SWELL TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Appendix 1 (cont'd)

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 29 SET/HAUL NO. 23
LOCATION: ESPERANZA INLET AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 49°31.4'N Long. 127°15.5'W
END: Lat. 49°29.6'N Long. 127°12.3'W
GEAR: EBT START TIME (PST) : 1505 DURATION (min): 35
BOTTOM DEPTH (m): START: 174 END: 150 EST. AV. DEPTH: 165
NET DEPTH RANGE m: - EST. AV. DEPTH: -
DIRECTION OF SET °true: 115 SPEED kn: 3.4 DISTANCE TRAVELLED km: 4.1
SET ON: - WATER CONDITION: SWELL TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 30 SET/HAUL NO. 24
LOCATION: CLAYOQUOT SOUND AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 49°05.0'N Long. 126°42.0'W
END: Lat. 49°02.8'N Long. 126°38.2'W
GEAR: EBT START TIME (PST) : 0800 DURATION (min): 60
BOTTOM DEPTH (m): START: 163 END: 150 EST. AV. DEPTH: 156
NET DEPTH RANGE m: - EST AV. DEPTH: -
DIRECTION OF SET °true: 120 SPEED kn: - DISTANCE TRAVELLED km: 5.2
SET ON: - WATER CONDITION: - TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Appendix 1 (cont'd)

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 30 SET/HAUL NO. 25
LOCATION: CLAYOQUOT SOUND AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 49°02.5'N Long. 126°37.0'W
END: Lat. 49°06.8'N Long. 126°40.0'W
GEAR: EBT START TIME (PST) : 1010 DURATION (min): 60
BOTTOM DEPTH (m): START: 148 END: 148 EST. AV. DEPTH: 148
NET DEPTH RANGE m: - EST. AV. DEPTH: -
DIRECTION OF SET *true: 305 SPEED kn: - DISTANCE TRAVELLED km: 7.0
SET ON: - WATER CONDITION: - TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 11 30 SET/HAUL NO. 26
LOCATION: CLAYOQUOT SOUND AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 49°05.1'N Long. 126°43.0'W
END: Lat. 49°03.0'N Long. 126°38.9'W
GEAR: EBT START TIME (PST) : 1200 DURATION (min): 60
BOTTOM DEPTH (m): START: 150 END: 148 EST. AV. DEPTH: 150
NET DEPTH RANGE m: - EST AV. DEPTH: -
DIRECTION OF SET *true: 105 SPEED kn: - DISTANCE TRAVELLED km: 5.6
SET ON: - WATER CONDITION: - TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Appendix 1 (cont'd)

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 12 01 SET/HAUL NO. 27
LOCATION: KAINS ISLAND AREA: WEST COAST VANCOUVER ISLAND
START: Lat. 50°19.0'N Long. 128°11.2'W
END: Lat. 50°21.8'N Long. 128°14.2'W
GEAR: EBT START TIME (PST) : 0930 DURATION (min): 60
BOTTOM DEPTH (m): START: 163 END: 139 EST. AV. DEPTH: 146
NET DEPTH RANGE m: - EST. AV. DEPTH: -
DIRECTION OF SET *true: 301 SPEED kn: - DISTANCE TRAVELLED km: 6.7
SET ON: - WATER CONDITION: - TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 12 02 SET/HAUL NO. 28
LOCATION: N. SIDE MEXICANA AREA: NORTH COAST VANCOUVER ISLAND
START: Lat. 51°07.0'N Long. 128°11.0'W
END: Lat. 51°09.9'N Long. 128°15.0'W
GEAR: EBT START TIME (PST) : 0840 DURATION (min): 60
BOTTOM DEPTH (m): START: 165 END: 163 EST. AV. DEPTH: 164
NET DEPTH RANGE m: - EST AV. DEPTH: -
DIRECTION OF SET *true: 15 SPEED kn: - DISTANCE TRAVELLED km: 7.4
SET ON: - WATER CONDITION: CALM TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

Appendix 1 (cont'd)

Yr Mo. Day
VESSEL: ARCTIC HARVESTER DATE: 77 12 02 SET/HAUL NO. 29
LOCATION: N. SIDE MEXICANA AREA: NORTH COAST VANCOUVER ISLAND
START: Lat. 51°05.6'N Long. 128°20.0'W
END: Lat. 51°05.7'N Long. 128°18.5'W
GEAR: EBT START TIME (PST) : 1045 DURATION (min): 20
BOTTOM DEPTH (m): START: 181 END: 181 EST. AV. DEPTH: 181
NET DEPTH RANGE m: - EST. AV. DEPTH: -
DIRECTION OF SET °true: 68 SPEED kn: - DISTANCE TRAVELLED km: 3.7
SET ON: - WATER CONDITION: - TIDE: -
WIND DIRECTION: - WIND SPEED: - RECORDER: A.C.
TTM: - TDM: - BT: - OTHER OCEANOGRAPHIC DATA: -

^aEBT - High opening Engel bottom trawl.

Appendix 2. Length frequency of lingcod by set off the west coast of Vancouver Island, M/V ARCTIC HARVESTER, November 22-December 2, 1977.

Set no. Fork length (cm)	1			2			4			6			7		
	M	F	T	F	M	F	T	M	F	T	M	F	T		
46	-	-	-	-	-	-	-	-	-	-	-	-	-		
47	-	-	-	-	-	-	-	-	-	-	1-	-	1		
48	-	-	-	-	-	-	-	-	-	-	0	-	0		
49	-	-	-	-	-	-	-	-	-	-	0	-	0		
50	-	-	-	-	-	-	-	-	-	-	0	-	0		
51	1	-	1	-	-	1	1	-	-	-	0	-	0		
52	0	1	1	1	-	0	0	1	1	2	0	-	0		
53	0	0	0	0	-	0	0	0	0	0	1	-	1		
54	0	0	0	0	-	0	0	0	0	0	-	-	0		
55	0	0	0	1	-	0	0	0	0	0	-	-	0		
56	1	0	1	0	-	0	0	0	1	1	-	-	0		
57	0	0	0	0	-	0	0	0	0	0	-	-	0		
58	0	0	0	0	-	0	0	0	0	0	-	-	0		
59	0	0	0	0	-	0	0	1	0	1	-	-	0		
60	0	0	0	0	-	0	0	-	0	0	-	-	0		
61	0	0	0	0	-	0	0	-	0	0	-	-	0		
62	0	0	0	0	-	0	0	-	0	0	-	-	0		
63	0	0	0	0	-	0	0	-	0	0	-	-	0		
64	0	0	0	0	-	0	0	-	0	0	-	-	0		
65	0	0	0	0	-	0	0	-	0	0	-	-	0		
66	0	0	0	0	-	0	0	-	0	0	-	-	0		
67	0	0	0	0	-	0	0	-	0	0	-	-	0		
68	0	0	0	0	-	0	0	-	0	0	-	-	0		
69	0	0	0	0	-	0	0	-	0	0	-	-	0		
70	0	0	0	0	-	0	0	-	1	1	-	-	0		
71	0	0	0	0	-	0	0	-	0	0	-	-	0		
72	0	0	0	0	-	0	0	-	0	0	-	-	0		
73	0	0	0	1	-	0	0	-	0	0	-	-	0		
74	0	0	0	0	-	1	1	-	0	0	-	-	0		
75	0	0	0	0	-	0	0	-	0	0	-	-	0		
76	1	0	1	0	1	0	1	-	1	1	-	-	0		
77	-	1	1	0	-	0	0	-	-	-	-	-	0		
78	-	0	0	0	-	0	0	-	-	-	-	-	0		
79	-	0	0	0	-	0	0	-	-	-	-	-	0		
80	-	0	0	0	-	0	0	-	-	-	-	-	0		
81	-	0	0	0	-	0	0	-	-	-	-	-	0		
82	-	0	0	0	-	0	0	-	-	-	-	-	0		
83	-	0	0	0	-	0	0	-	-	-	-	1	1		
84	-	0	0	0	-	1	1	-	-	-	-	1	1		
85	-	0	0	0	-	1	1	-	-	-	-	0	0		
86	-	1	1	0	-	0	0	-	-	-	-	0	0		
87	-	0	0	0	-	0	0	-	-	-	-	0	0		
88	-	0	0	0	-	0	0	-	-	-	-	0	0		

Appendix 2 (cont'd)

Set no. Fork length (cm)	1			2	4			6			7		
	M	F	T	F	M	F	T	M	F	T	M	F	T
89	-	0	0	0	-	1	1	-	-	-	-	0	0
90	-	0	0	0	-	0	0	-	-	-	-	1	1
91	-	0	0	0	-	0	0	-	-	-	-	-	-
92	-	0	0	0	-	1	1	-	-	-	-	-	-
93	-	0	0	0	-	-	-	-	-	-	-	-	-
94	-	0	0	0	-	-	-	-	-	-	-	-	-
95	-	0	0	0	-	-	-	-	-	-	-	-	-
96	-	0	0	0	-	-	-	-	-	-	-	-	-
97	-	0	0	0	-	-	-	-	-	-	-	-	-
98	-	0	0	0	-	-	-	-	-	-	-	-	-
99	-	0	0	0	-	-	-	-	-	-	-	-	-
100	-	0	0	0	-	-	-	-	-	-	-	-	-
101	-	0	0	0	-	-	-	-	-	-	-	-	-
102	-	0	0	0	-	-	-	-	-	-	-	-	-
103	-	0	0	0	-	-	-	-	-	-	-	-	-
104	-	0	0	0	-	-	-	-	-	-	-	-	-
105	-	0	0	1	-	-	-	-	-	-	-	-	-
106	-	0	0	-	-	-	-	-	-	-	-	-	-
107	-	0	0	-	-	-	-	-	-	-	-	-	-
108	-	0	0	-	-	-	-	-	-	-	-	-	-
109	-	0	0	-	-	-	-	-	-	-	-	-	-
110	-	0	0	-	-	-	-	-	-	-	-	-	-
111	-	0	0	-	-	-	-	-	-	-	-	-	-
112	-	0	0	-	-	-	-	-	-	-	-	-	-
113	-	0	0	-	-	-	-	-	-	-	-	-	-
114	-	1	1	-	-	-	-	-	-	-	-	-	-
115	-	-	-	-	-	-	-	-	-	-	-	-	-
116	-	-	-	-	-	-	-	-	-	-	-	-	-
117	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	3	5	8	4	1	6	7	2	4	6	2	3	5

Appendix 2 (cont'd)

Set no. Fork length (cm)	8			10			11			12	13
	M	F	T	M	F	T	M	F	T	F	F
46	-	-	-	-	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-	1	1	-	-
48	-	-	-	-	-	-	-	0	0	-	-
49	-	-	-	-	-	-	-	2	2	-	-
50	1	-	1	-	-	-	-	0	0	-	-
51	-	-	0	-	-	-	-	1	1	-	-
52	-	-	0	-	-	-	1	0	1	-	-
53	-	-	0	-	-	-	1	1	2	-	-
54	-	-	0	-	-	-	0	0	0	-	-
55	-	-	0	-	-	-	0	1	1	-	-
56	-	-	0	-	-	-	1	0	1	-	-
57	-	-	0	-	-	-	0	0	0	-	-
58	-	-	0	-	-	-	0	1	1	-	-
59	-	-	0	-	-	-	0	1	1	-	-
60	-	-	0	-	-	-	0	1	1	-	-
61	-	-	0	1	1	2	1	1	2	-	-
62	-	-	0	-	0	0	-	0	0	-	-
63	-	-	0	-	0	0	-	0	0	-	-
64	-	-	0	-	0	0	-	1	1	-	-
65	-	-	0	-	0	0	-	1	1	-	-
66	-	-	0	-	0	0	-	0	0	-	-
67	-	-	0	-	0	0	-	1	1	-	-
68	-	-	0	-	1	1	-	1	1	-	-
69	-	-	0	-	1	1	-	0	0	-	-
70	-	-	0	-	1	1	-	1	1	-	-
71	-	-	0	-	0	0	-	3	3	-	-
72	-	-	0	-	1	1	-	0	0	-	-
73	-	-	0	-	1	1	-	1	1	-	-
74	-	-	0	-	1	1	-	2	2	-	-
75	-	-	0	-	2	2	-	2	2	-	-
76	-	-	0	-	2	2	-	0	0	-	-
77	-	-	0	-	2	2	-	0	0	-	-
78	-	-	0	-	5	5	-	2	2	-	-
79	-	-	0	-	3	3	-	1	1	-	-
80	-	-	0	-	6	6	-	0	0	-	1
81	-	-	0	-	2	2	-	1	1	1	-
82	-	-	0	-	8	8	-	4	4	0	-
83	-	-	0	-	12	12	-	2	2	0	-
84	-	-	0	-	13	13	-	4	4	0	-
85	-	-	0	-	10	10	-	0	0	0	-
86	-	-	0	-	6	6	-	0	0	1	-
87	-	-	0	-	9	9	-	0	0	0	-
88	-	1	1	-	8	8	-	2	2	0	-
89	-	-	-	-	5	5	-	1	1	0	-
90	-	-	-	-	3	3	-	0	0	0	-

Appendix 2 (cont'd)

Set no. Fork length cm)	8			10			11			12	13
	M	F	T	M	F	T	M	F	T	F	F
91	-	-	-	-	2	2	-	2	2	0	-
92	-	-	-	-	1	1	-	0	0	0	-
93	-	-	-	-	1	1	-	1	1	0	-
94	-	-	-	-	2	2	-	0	0	0	-
95	-	-	-	-	1	1	-	0	0	0	-
96	-	-	-	-	1	1	-	0	0	0	-
97	-	-	-	-	1	1	-	1	1	0	-
98	-	-	-	-	1	1	-	2	2	1	-
99	-	-	-	-	4	4	-	0	0	0	-
100	-	-	-	-	1	1	-	0	0	0	-
101	-	-	-	-	2	2	-	0	0	0	-
102	-	-	-	-	0	0	-	1	1	1	-
103	-	-	-	-	1	1	-	0	0	-	-
104	-	-	-	-	1	1	-	0	0	-	-
105	-	-	-	-	1	1	-	0	0	-	-
106	-	-	-	-	-	-	-	1	1	-	-
107	-	-	-	-	-	-	-	1	1	-	-
108	-	-	-	-	-	-	-	-	-	-	-
109	-	-	-	-	-	-	-	-	-	-	-
110	-	-	-	-	-	-	-	-	-	-	-
111	-	-	-	-	-	-	-	-	-	-	-
112	-	-	-	-	-	-	-	-	-	-	-
113	-	-	-	-	-	-	-	-	-	-	-
114	-	-	-	-	-	-	-	-	-	-	-
115	-	-	-	-	-	-	-	-	-	-	-
116	-	-	-	-	-	-	-	-	-	-	-
117	-	-	-	-	-	-	-	-	-	-	-
Total	1	1	2	1	123	124	4	49	53	4	1

Appendix 2 (cont'd)

Set no. Fork length (cm)	14			15	18	19	20
	M	F	T	F	F	F	F
40	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-
48	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-
53	-	-	-	-	-	-	-
54	-	-	-	-	-	-	-
55	-	-	-	-	-	-	-
56	-	-	-	-	-	-	-
57	-	-	-	-	-	-	-
58	-	-	-	-	-	-	-
59	-	-	-	-	-	-	-
60	-	-	-	-	-	-	-
61	-	-	-	-	-	-	-
62	-	-	-	-	-	-	-
63	1	-	1	-	-	-	-
64	-	-	0	-	-	-	-
65	-	-	0	-	-	-	-
66	-	-	0	-	-	-	-
67	-	-	0	-	-	-	-
68	-	-	0	-	-	-	-
69	-	-	0	-	-	-	-
70	-	-	0	-	-	-	-
71	-	-	0	-	-	-	-
72	-	-	0	-	-	-	-
73	-	1	1	1	-	-	-
74	-	1	1	0	-	-	-
75	-	1	1	0	-	-	-
76	-	2	2	0	-	-	-
77	-	1	1	2	-	-	-
78	-	1	1	2	-	-	-
79	-	0	0	1	-	-	1
80	-	2	2	4	-	-	-
81	-	3	3	1	-	-	-
82	-	2	2	2	-	-	-
83	-	1	1	3	-	-	-
84	-	1	1	1	1	-	-
85	-	2	2	2	-	-	-
86	-	6	6	4	-	-	-
87	-	0	0	3	-	-	-
88	-	2	2	1	-	-	-
89	-	0	0	0	-	-	-
90	-	1	1	2	-	-	-

Appendix 2 (cont'd)

Set no. Fork length (cm)	14			15	18	19	20
	M	F	T	F	F	F	F
91	-	0	0	0	-	-	-
92	-	1	1	1	-	-	-
93	-	0	0	0	-	-	-
94	-	3	3	1	-	-	-
95	-	0	0	1	-	-	-
96	-	1	1	0	-	-	-
97	-	0	0	0	-	1	-
98	-	1	1	0	-	-	-
99	-	0	0	0	-	-	-
100	-	1	1	1	-	-	-
101	-	0	0	0	-	-	-
102	-	1	1	0	-	-	-
103	-	-	-	0	-	-	-
104	-	-	-	0	-	-	-
105	-	-	-	0	-	-	-
106	-	-	-	1	-	-	-
107	-	-	-	1	-	-	-
108	-	-	-	0	-	-	-
109	-	-	-	0	-	-	-
110	-	-	-	1	-	-	-
111	-	-	-	-	-	-	-
112	-	-	-	-	-	-	-
113	-	-	-	-	-	-	-
114	-	-	-	-	-	-	-
115	-	-	-	-	-	-	-
116	-	-	-	-	-	-	-
117	-	-	-	-	-	-	-
Total	1	35	36	36	1	1	1

Appendix 2 (cont'd)

Set no.	22	23	24			25			26		
Fork length (cm)	F	F	M	F	T	M	F	T	M	F	T
46	-	-	-	-	-	-	-	-	-	1	1
47	-	-	-	-	-	-	-	-	-	0	0
48	-	-	-	-	-	-	1	1	-	0	0
49	-	-	-	1	1	-	0	0	-	0	0
50	-	-	-	0	0	-	1	1	-	1	1
51	-	-	-	0	0	-	0	0	-	0	0
52	-	-	-	0	0	-	4	4	-	1	1
53	-	-	1	0	1	-	1	1	-	1	1
54	-	-	0	0	0	-	0	0	-	0	0
55	-	-	0	0	0	-	0	0	-	0	0
56	-	-	1	2	3	-	0	0	-	0	0
57	-	-	0	0	0	1	1	2	-	0	0
58	-	-	0	0	0	0	0	0	-	0	0
59	-	-	0	0	0	0	0	0	-	0	0
60	-	-	1	1	2	0	0	0	1	0	1
61	-	-	0	1	1	0	0	0	0	0	0
62	-	-	0	0	0	1	0	1	1	0	1
63	-	-	0	0	0	0	0	0	1	0	1
64	-	-	0	0	0	0	2	2	0	2	2
65	-	-	0	1	1	0	1	1	0	1	1
66	-	-	0	2	2	0	1	1	0	3	3
67	-	-	0	3	3	2	0	2	2	1	3
68	-	-	0	1	1	-	3	3	1	3	4
69	-	-	1	1	2	-	2	2	0	2	2
70	-	-	-	1	1	-	6	6	0	6	6
71	-	-	-	8	8	-	4	4	0	4	4
72	-	-	-	2	2	-	3	3	0	3	3
73	-	-	-	3	3	-	3	3	2	7	9
74	-	-	-	2	2	-	3	3	-	11	11
75	-	-	-	0	0	-	5	5	-	4	4
76	1	-	-	3	3	-	5	5	-	9	9
77	0	-	-	5	5	-	6	6	-	6	6
78	0	-	-	11	11	-	6	6	-	15	15
79	0	-	-	10	10	-	8	8	-	11	11
80	0	-	-	10	10	-	4	4	-	15	15
81	0	-	-	9	9	-	6	6	-	16	16
82	0	-	-	11	11	-	5	5	-	17	17
83	0	-	-	7	7	-	2	2	-	20	20
84	0	-	-	8	8	-	5	5	-	21	21
85	0	-	-	13	13	-	18	18	-	12	12
86	1	-	-	6	6	-	5	5	-	15	15
87	1	-	-	8	8	-	9	9	-	12	12
88	0	-	-	7	7	-	3	3	-	9	9
89	1	-	-	4	4	-	5	5	-	3	3
90	0	-	-	3	3	-	2	2	-	4	4

Appendix 2 (cont'd)

Set no.	22	23	24			25			26		
Fork length (cm)	F	F	M	F	T	M	F	T	M	F	T
91	0	-	-	2	2	-	6	6	-	0	0
92	0	1	-	3	3	-	3	3	-	7	7
93	0	0	-	4	4	-	1	1	-	1	1
94	0	0	-	2	2	-	1	1	-	1	1
95	0	0	-	2	2	-	0	0	-	0	0
96	0	0	-	2	2	-	3	3	-	2	2
97	0	0	-	2	2	-	1	1	-	3	3
98	0	0	-	3	3	-	0	0	-	1	1
99	1	1	-	0	0	-	0	0	-	1	1
100	0	0	-	1	1	-	2	2	-	0	0
101	0	0	-	1	1	-	2	2	-	2	2
102	0	0	-	0	0	-	1	1	-	1	1
103	1	0	-	0	0	-	0	0	-	0	0
104	0	1	-	0	0	-	2	2	-	2	2
105	0	0	-	1	1	-	1	1	-	0	0
106	0	0	-	0	0	-	0	0	-	0	0
107	1	1	-	0	0	-	0	0	-	0	0
108	-	-	-	0	0	-	0	0	-	1	1
109	-	-	-	0	0	-	0	0	-	0	0
110	-	-	-	0	0	-	0	0	-	0	0
111	-	-	-	0	0	-	0	0	-	0	0
112	-	-	-	0	0	-	0	0	-	0	0
113	-	-	-	0	0	-	0	0	-	1	1
114	-	-	-	0	0	-	1	1	-	-	-
115	-	-	-	0	0	-	-	-	-	-	-
116	-	-	-	0	0	-	-	-	-	-	-
117	-	-	-	1	1	-	-	-	-	-	-
Total	7	4	4	168	172	4	154	158	8	259	267

Appendix 2 (cont'd)

Set no. Fork length (cm)	27	28			Total		
	F	M	F	T	M	F	T
46	-	-	-	-	-	1	1
47	-	-	-	-	1	1	2
48	-	-	-	-	0	1	1
49	-	-	-	-	0	3	3
50	-	-	-	-	1	2	3
51	-	-	-	-	2	8	10
52	-	-	-	-	4	3	7
53	-	1	-	1	0	0	0
54	-	-	-	0	0	2	2
55	-	-	-	0	0	2	2
56	-	-	-	0	3	3	6
57	-	-	-	0	1	1	2
58	-	-	-	0	0	1	1
59	-	-	-	0	1	1	2
60	-	-	-	0	2	2	4
61	-	-	-	0	2	3	5
62	-	-	-	0	2	0	2
63	-	-	-	0	2	0	2
64	-	-	-	0	0	5	5
65	-	-	-	0	0	4	4
66	-	-	-	0	0	6	6
67	-	-	-	0	4	5	9
68	-	-	-	0	1	9	10
69	-	-	-	0	1	6	7
70	-	-	-	0	0	16	16
71	-	-	-	0	0	19	19
72	-	-	-	0	0	9	9
73	-	-	-	0	2	18	20
74	-	-	-	0	0	21	21
75	-	-	-	0	0	14	14
76	-	-	-	0	2	23	25
77	1	-	-	0	-	24	24
78	0	-	-	0	-	42	42
79	0	-	-	0	-	35	35
80	0	-	-	0	-	42	42
81	0	-	-	0	-	39	39
82	0	-	-	0	-	49	49
83	1	-	-	0	-	49	49
84	-	-	-	0	-	56	56
85	-	-	-	0	-	58	58
86	-	-	-	0	-	45	45
87	-	-	-	0	-	42	42
88	-	-	-	0	-	33	33
89	-	-	-	0	-	20	20
90	-	-	-	0	-	17	17
91	-	-	1	1	-	13	13

Appendix 2 (cont'd)

Set no. Fork length (cm)	27	28			Total		
	F	M	F	T	M	F	T
92	-	-	-	-	-	18	18
93	-	-	-	-	-	8	8
94	-	-	-	-	-	10	10
95	-	-	-	-	-	4	4
96	-	-	-	-	-	9	9
97	-	-	-	-	-	9	9
98	-	-	-	-	-	9	9
99	-	-	-	-	-	7	7
100	-	-	-	-	-	6	6
101	-	-	-	-	-	7	7
102	-	-	-	-	-	5	5
103	-	-	-	-	-	2	2
104	-	-	-	-	-	6	6
105	-	-	-	-	-	4	4
106	-	-	-	-	-	2	2
107	-	-	-	-	-	3	3
108	-	-	-	-	-	1	1
109	-	-	-	-	-	0	0
110	-	-	-	-	-	2	2
111	-	-	-	-	-	0	0
112	-	-	-	-	-	0	0
113	-	-	-	-	-	1	1
114	-	-	-	-	-	2	2
115	-	-	-	-	-	0	0
116	-	-	-	-	-	0	0
117	-	-	-	-	-	1	1
Total	2	1	1	2	32	869	901

Appendix 3. Age frequency of lingcod by set off the west coast of Vancouver Island, M/V ARCTIC HARVESTER, November 22-December 2, 1977.

Set no. Fork length (cm)	1			2	4			6			7		
	M	F	T	F	M	F	T	M	F	T	M	F	T
2	1	1	2	1	-	1	1	1	-	1	1	-	1
3	0	0	0	0	-	0	0	-	1	1	0	-	0
4	1	0	1	1	-	0	0	0	1	1	0	-	0
5	0	1	1	1	-	0	0	0	0	0	0	-	0
6	1	0	1	0	-	1	1	2	1	3	0	1	1
7	-	2	2	0	-	2	2	-	-	-	1	1	2
8	-	0	0	0	-	2	2	-	-	-	-	-	0
9	-	0	0	0	1	-	1	-	-	-	-	1	1
10	-	0	0	0	-	-	-	-	-	-	-	-	-
11	-	1	1	0	-	-	-	-	-	-	-	-	-
12	-	-	-	0	-	-	-	-	-	-	-	-	-
13	-	-	-	1	-	-	-	-	-	-	-	-	-
Total	3	5	8	3	1	6	7	3	3	6	2	3	5

Appendix 3 (cont'd)

Set no.	8			10			11			12			13
Fork length (cm)	M	F	T	M	F	T	M	F	T	M	F	T	F
2	1	-	1	-	-	-	1	4	5	-	-	-	-
3	-	-	0	-	-	-	2	2	4	-	-	-	-
4	-	-	0	-	4	4	1	6	7	1	-	1	-
5	-	-	0	-	8	8	-	5	5	-	-	0	1
6	-	-	0	1	35	36	-	10	10	-	-	0	-
7	-	1	1	-	31	31	-	10	10	-	1	1	-
8	-	-	-	-	32	32	-	6	6	-	0	0	-
9	-	-	-	-	8	8	-	3	3	-	3	3	-
10	-	-	-	-	2	2	-	0	0	-	-	-	-
11	-	-	-	-	3	3	-	1	1	-	-	-	-
12	-	-	-	-	-	-	-	1	1	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	1	1	2	1	123	124	4	48	52	1	4	5	1

Appendix 3 (cont'd)

Set no.	14			15	18	19	22
Fork length (cm)	M	F	T	F	F	F	F
2	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-
4	1	1	2	2	-	-	-
5	-	6	6	8	-	-	2
6	-	9	9	11	-	-	1
7	-	11	11	12	1	-	1
8	-	6	6	1	-	1	1
9	-	1	1	1	-	-	0
10	-	1	1	-	-	-	1
11	-	-	-	-	-	-	1
12	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-
Total	1	35	36	35	1	1	7

Appendix 3 (cont'd)

Set no. Fork length (cm)	23	24			25			26			Total		
	F	M	F	T	M	F	T	M	F	T	M	F	T
2	-	1	1	2	-	6	6	-	-	-	6	14	20
3	-	1	4	5	-	3	3	1	11	12	4	21	25
4	-	1	12	13	2	8	10	2	16	18	9	51	60
5	-	1	22	23	1	25	26	2	51	53	4	130	134
6	-	-	49	49	-	41	41	3	93	96	7	252	259
7	-	-	50	50	-	32	32	-	54	54	1	209	210
8	1	-	24	24	-	13	13	-	15	15	0	102	102
9	0	-	3	3	-	6	6	-	6	6	1	32	33
10	1	-	0	0	-	0	0	-	2	2	-	7	7
11	0	-	2	2	-	4	4	-	3	3	-	15	15
12	1	-	-	-	-	1	1	-	1	1	-	4	4
13	-	-	-	-	-	-	-	-	-	-	-	1	1
Total	3	4	167	171	3	139	142	8	252	260	32	838	870